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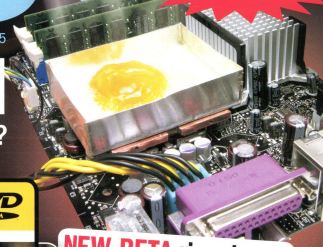
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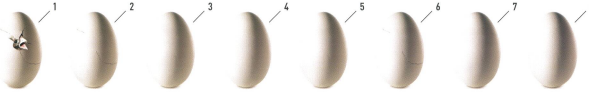
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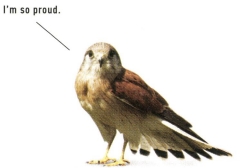

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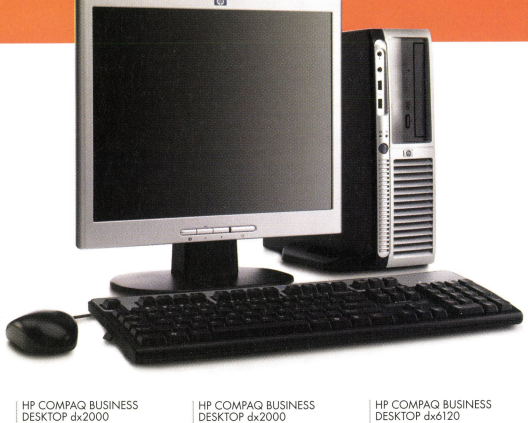
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OCTOBER 2005




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# Coverdisc

OCTOBER 2005

**Full version apc** This logo indicates a free, complete and unrestricted software package, available only on *APC*'s cover DVD.

**On the cover DVD apc** When you see this icon throughout *APC*, it means bonus software included on the cover disc.




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Close-up images of translucent Glass windows, the redesigned Start menu, Internet Explorer 7 and more.







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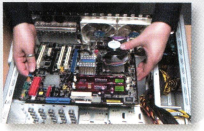
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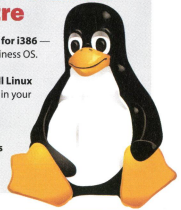
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# Editorial

TONY SARNO



We all remember where we were when big events broke. When the New York Yacht Club fired the cannon marking Australia II's victory in the America's Cup, I remember looking out from my flat at the Pacific Ocean, over the pines at Manly beach in Sydney, years away from my first paying job. And one of my earliest memories was of my mum walking into my bedroom and saying, "They've got another Kennedy," when Bobby Kennedy was shot in 1968.

The really bizarre thing is that alongside these big events, I can also recall each launch of Windows — excluding the first two, because they were so insignificant in a DOS universe.

But I clearly remember the arrival of Windows/386 in 1987, when I was a cadet tech reporter in a major newspaper. It turned up largely unheralded in a nice-looking box via courier. No-one was game enough to install it, but I was attracted by the claim that it could make a PC look like a Mac and run multiple DOS applications in extended memory.

I installed it, saw that it looked like a bunch of coloured DOS windows and uninstalled it within five minutes because it kept refusing to close the Windows once I opened them. I still have the program in the original box.

The marketing hysteria machine then kicked in with the launch of Windows 3.0 in late 1990. This was the first version of Windows that had a lot of applications developed for it. I clearly recall 3.0 because it was also the first time I ran the Windows version of Excel.

I won't bore you with the details of where I was when Windows 3.11, 95/98 and XP were released, but I can tell you where I was when I had my first good look at Vista, the next generation of Windows. In the *APC* Labs in August, with the tech team who had installed it on a test machine.

When we heard that Microsoft was about to issue the first official beta containing many features expected to be in the release version, we set a challenge as to who would get their hands on it first.

*APC*'s DVD editor Lachlan Grant, who prides himself on being able to get any software any time from anywhere, was confident he'd secure it in hours. News editor Dan Warne has contacts in high places who he said could get him one quickly. And Labs editor John Gillooly said we shouldn't bother as it'd soon be available via the MSDN subscription service anyway. In the end, we all got copies at about the same time.

It was obvious that this was a vastly redesigned OS compared to Windows XP. If it were a car, it would resemble the previous model but with every body panel and detail changed. The changes are covered on page 82.

## Vista resembles the previous version but with every detail updated

In order to give you a sense of what it really looks like, we've included hundreds of screen shots on this month's cover DVD.

As *APC* Labs puts this beta and subsequent ones through their paces in the following months, there'll be nothing about Vista you won't know by the time it's officially released late next year.

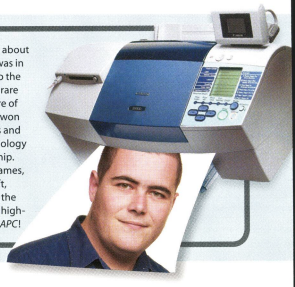
## STAFF FILE

**Name:** John Gillooly **Age:** 29
**Likes:** Open standards **Hates:** Buzzwords
**Favourite Band:** Anything on Ipecac Records
**Drives:** The bus

Each month, I will introduce a member of the team, starting with Labs Editor John Gillooly. The Labs Editor manages reviews and product comparisons and all that goes on in *APC* Labs.

Like many people passionate about working in computer magazines, Gillooly didn't start off with an IT degree. He did a Bachelor of Science in Pedogeomorphology — for the uninitiated, that's the study of soil formation and landscape history. He used to get really excited about ant mounds before he got really excited about computers. His true passion and talent was in building and overclocking computers, to the point where, on 1 May, 2001, he had the rare honour of holding the world record score of 6,579 in 3DMark2001. Since then he has won Rookie of the Year awards on magazines and now finds himself on *APC* to cover technology for Australia's most demanding readership.

At home, Gillooly helps run online games, recently shifting to the World of Warcraft, where he has a level 60 Troll Shaman on the "Proudmoore" server. Clearly, Gillooly is high-performance, hence his recruitment for *APC*!



# Need to Know

**News, views and analysis from the IT world**

# Consumer buying power

**Psst. . . want to buy an LCD monitor for $1,000?**

Huge discounts are being negotiated by renegade groups of Australian PC shoppers who are consolidating their orders to obtain lower prices from big names.

One group of online forum users purchased Dell's $1,789 24in LCD monitor for $1,079 from the company's Web site. That specific price took advantage of a Dell coupon for $400 off orders over $2,500, allowing users to buy lots of two 24in monitors, which at the time, were on sale for $1,279 each.

But neither Dell nor the online forum Whirlpool.net.au are keen on the emerging trend. Dell corporate affairs manager Paul McKeon said that "as a rule", they don't support such a concept. "The best price is on the Web — we advertise special offers several times a week."

Whirlpool founder Simon Wright has banned new discussions on "group buys" but has allowed existing group-buy purchases to be completed. "Whirlpool has a long-standing policy disallowing 'for sale' and 'want to buy' threads.

"The same policy was extended to group buys, as such discussions represent a fraud risk to consumers and legal risk to Whirlpool when transactions go bad. Further, it can be abused by retailers to get around our no-advertising policy."




**Bulk buys: renegade groups will hurt the industry, say retailers.**

The potential exists for retailers to pose as ordinary customers and start bogus group-buy offers, pointing to inflated "before" prices to justify supposed "discount" ones.

Retailers complained that the concept puts further pressure on the industry. ". . .you can't expect a huge discount unless there was a high mark-up in the first place," said Emagen's David Kong.

Retailers refusing to offer group-buy discounts have been cut down to size by people who claim they're unaware of how to turn it to their advantage. "They did not understand that they could . . .get an injection of high-volume, low-margin business," said one user in an online post.

However, some companies are harnessing the consumer buying power. "We ask users to approach a retailer who can then negotiate a special price with us," said PC Range's Raaj Menon.

"A lot of resellers and distributors don't like this idea due to the fact that it cuts down on their margins. But we like this concept — it provides savings for end users and an opportunity for us to cut our internal costs by being able to sell a bulk consignment of equipment at once."

***Dan Warne***

## this month


**16 eBay's fraud fighter**

eBay's Alastair MacGibbon on online security and eBay's controversial refund system.

**20 Taking on the music industry**

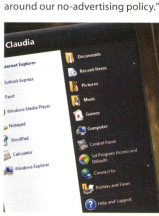
When one bloke was busted for linking to pirated music, the effects rippled through the entire Internet industry.

**28 Watchdog**

A missing PC, notebook battery woes and iPod returns plague some readers, while another's faith in IBM is restored.

**30 Opinion**

*Dan Warne* has some brainwaves for PC makers. *Mary Jo Foley* asks if Windows x64 is really just a Longhorn beta.


# Hasta la Vista, Longhorn

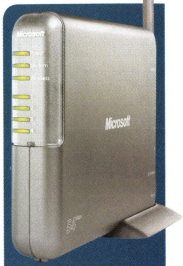
**The first official beta of the next generation of Windows, codenamed Longhorn, has been unveiled.**

It includes Internet Explorer 7 with tabbed browsing and an early release of the new 3D graphical user interface that had been omitted from earlier beta releases. The GUI has document icons that are miniature renderings of the documents themselves and glossy translucent windows. Desktop search is also integrated into the operating system.

The OS has been officially dubbed "Windows Vista", as it will apparently provide "clarity in your world." Reaction to the name was mixed, with many online polls showing a majority of users don't like it. Users said it evoked memories of search engines that lost the race with Google, pointing out that one dictionary definition of vista was "a distant view or prospect" and that it was amusingly similar to the name of a pirated software Web site.

**See *APC*'s in-depth look at what's inside beta 1 on page 82.**

## Is it legal. . .




### Wi-Fi freeloading

**If you connect to someone else's unsecured Wi-Fi and use their Internet bandwidth, are you breaking the law?**

**In Australia, Federal and State legislation have penalties for "interfering with a telecommunications service" or "intercepting an electronic communication". Significantly, though, many of these provisions are based on an initial breach of security — the electronic equivalent of breaking and entering — so it could be argued that they don't apply to wireless networks without security.**

**Ultimately, time-tested theft and trespass laws would probably cover using Wi-Fi to those "borrowing" someone else's Internet connection. This legal approach has been used in the US.**

**Although Australian law hasn't developed a specific offence for Wi-Fi freeloading, all Wi-Fi users should ensure that their networks are properly secure to protect themselves against unexpected usage bills.**

*Alan Crawford is a lawyer with Henry Davis York.*
*alan_crawford@hdy.com.au*
*Disclaimer: this does not constitute legal advice.*



Cutting the wires: mobile networks are confident they'll hit the streets before WiMax.

# Will 3G beat WiMax to the punch?

**Mobile networks say they'll be delivering wireless broadband services years before WiMax hits the streets.**

A new technology, high speed downlink packet access (HSDPA), runs over 3G networks and will initially provide real-life speeds of 1 to 2Mbit/s.

Network operator Vodafone is already testing HSDPA on its New Zealand 3G network. Mobile network operators could use it to cut Telstra out of home telephony altogether by installing HSDPA transponders on residences, to provide home broadband as well as telephony through the wireless link.

In the shorter term, standard 3G networks can offer up to 384Kbit/s and are expected to offer lower pricing on mobile broadband once all four of the major networks start competing.

Optus director of products and delivery Chris Lane expects 3G hardware will be cheaper than most of the other wireless broadband products.

"What we expect to see is that as the world transitions to 3G, the cost of components, chipsets and cards will fall dramatically. We've seen that in DSL," he said.

Basic ADSL modems started in the $350 – $500 price range in 2000 but are now available for $50 to $100.

Lane admitted that GPRS hardware was still expensive despite the technology's introduction onto GSM networks several years ago but only because "users didn't find the GPRS experience that great".

He added, "You could pretty much get a dialup connection anywhere, but it cost you more. It was never the right technology for laptops."

3G sales are already ramping up, with Dell chairman and founder Michael Dell indicating that his company will start selling 3G cards with notebooks. Mobile phone network operators are pondering whether they should sell notebooks with 3G chips built in, as "zero dollar upfront" deals. Ericsson's Andrei Dulski said 80% of the networks his company has surveyed worldwide are interested in this.

Only Telstra has advocated a different standard — EV-DO over its CDMA network. Telstra's wireless chief, Hollie Kramer, told *APC*: "To be honest, in our tests [of 3G] we are struggling to call the service broadband."

Instead, the telco has dropped prices on EV-DO and relaunched it as "BigPond Wireless Broadband" with plans available at speeds of 256Kbit/s and 512Kbit/s. Desktop PC users can join a $44.95 plan which gives them 1GB of usage at 256Kbit/s using a $199 desktop modem. Laptop users who need national coverage can join higher priced plans ($99.95 for 1GB at 256Kbit/s, using a $299 PCMCIA modem) and roam onto the 144Kbit/s CDMA 1XRTT service when outside EV-DO coverage areas.

The major downside of EV-DO is that Telstra is the only carrier offering it in Australia, so, unlike 3G phones, the hardware can't be used on another network if a better deal becomes available.

***Dan Warne***

### wireless speeds compared

| TECHNOLOGY | DATA TECHNOLOGY | SPEED (Kbit/s) 0 – 2,000 |
|---|---|---|
| GSM | GPRS | 40 |
| 3G | 3G | 384 |
| CDMA | EV-DO | 500 |
| 3G | HSDPA | 2,000 |

# Technical battles loom in AMD suit

**AMD, Intel set to face off in a US court battle that will expose the inner workings of the technical committees that decide key PC standards.**

AMD filed an antitrust lawsuit against Intel in July after a Japanese antitrust ruling against the processor giant. Legal experts have predicted that hearings may not begin until 2007. However, if the experience of previous IT industry antitrust trials is anything to go by, allegations and counter-allegations will fly well before the first gavel descends.

Many of AMD's claims centre on Intel's marketing practices (see "Intel's top five sins as alleged by AMD", below), but it also argues that the company has utilised its muscle to hinder competition on technical grounds. Two of its core arguments focus on Intel's work with memory management standards committees.

In the brief, filed with a US court in Delaware, AMD argued that Intel created the Advanced DRAM Technology (ADT) consortium specifically to exclude its rivals from access to key technology information.

Which CPU cooks an egg quickest? AMD or Intel?

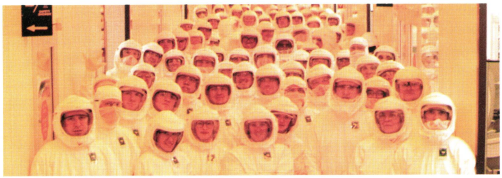
FIND OUT ON PAGE 72

"By foreclosing AMD from input or access to the memory standard during its development process, Intel deliberately placed AMD at a severe competitive disadvantage," AMD's filing read.

While ADT ultimately proved something of a washout, AMD also claimed technical shenanigans took place more recently in the Joint Electronic Device Engineering Council (JEDEC). AMD alleged that during the development of DDR3 standards, Intel deliberately promoted a design that would radically alter the pin layouts. AMD argued that this method was designed to disadvantage its own design approach, which relies on embedding the memory control directly on the processor and thus more difficult to modify if pin allocations changed.

One potential flaw in AMD's argument is that Intel's proposal failed to be accepted by the JEDEC committee. However, similar examples are likely to surface once the case gets underway. Intel has denied the allegations.

***Angus Kidman***



**Preparing for drawn-out battle: long-time rivals brace themselves for yet another legal skirmish.**

## Intel's top five sins as alleged by AMD

**AMD's complaint against Intel alleges a variety of anti-competitive behaviours, including the following:**

- Offering cash payments of millions of dollars to major PC vendors, including Dell, Toshiba and Sony, in return for them only using Intel processors in their machines — a strategy that AMD claims was adopted for both enterprise and consumer customers.
- **Utilising rebate schemes and caps, where Intel offers discounts and helps sponsor marketing campaigns if vendors order a certain quantity of processors from them, to effectively lock AMD out of competition.**
- Threatening vendors who used AMD processors in their PC line, or who were contemplating doing so, with the withdrawal of rebates or limiting access to new-release processors.
- **Designing its code compilers (which are popular because they give ISVs access to Intel-specific performance enhancements) so that code runs efficiently on Intel processors but is liable to crash when used on an AMD processor.**
- Attempting to create industry standards committees that deliberately exclude AMD from participation and making technical suggestions to bodies such as the Advanced DRAM Consortium that would make it more difficult for AMD to remain competitive.

## decode

### Mash-ups

**What is it?** **Remixing the Web: using someone else's Web service (like Google Maps) to create an entirely new Web site (such as a live map of murders as they happen based on police reports).**

**Should you care?** **It's a taste of what you can expect to see in the next few years as Web services take off. Google has embraced it, releasing an API for Google Maps.**

**APC Verdict:** **Awesome. Web services allow you to take all the information held in database on the Web and tie it together into more useful info.**




### LETTING THE CAT OUT OF THE XBOX

**"My step dad works here in seattle for xbox hes the tester guy. He had a trip to mexico to test the new xbox so he had to bring it home and he let me play it. I uesto hATE xbox purley a PS fan. but WOW new xbox has some COol stuff. OH one more thing im not supposed tell this, but the power supply conecter thing for the xbox, lets just say its not COMPACT."**

— A 13-year-old posting on Gamespot.com, who later begged the site to take his post down. Microsoft offered a dour, "We have no further comment at this time." Hope Dad still has a job.

**Want to nominate a dumbest moment in tech?** Send an email with the subject line Dumbest Moments to dwarne@acpmagazines.com.au. All correspondence becomes the property of *APC*.

## in brief

### WINDOWS KEYS FOR SALE

**Microsoft has effectively conceded that a pirated copy of Windows is as good as the real thing. It will now sell an XP Professional serial number to a user of a pirated version of Windows for $238, as part of its "Windows Genuine Advantage" program, which forces users to go through a second round of validation when they download a Windows update. Security updates will continue to be available to pirated Windows users.**



### GOOGLE BACKS POWERLINES PLAN

**Two of the wealthiest companies in tech, Google and IBM, have invested in broadband over powerline (BPL) technology. Google is part of a US$100 million joint venture with US company Current Communications to fund a rollout of BPL across the USA. IBM's investment is more modest, sponsoring a trial for 50 homes in Texas. Neither company would comment on whether the investments would touch Australia.**

### LINUX ON YOUR MOBILE

**Nokia has announced its first Linux-based mobile device, a small tablet PC in a PSP-like form-factor. It's said to be planning a switch from Symbian to Linux for its smartphones. Palm has also said it will port PalmOS to Linux, which would make Linux the leading mobile OS worldwide.**




# Extreme Geek

## Whoah, nice rack!

Thomas Jackson is an ordinary Sydney-based 16-year-old. Except that when his mates turn their heads and say "nice rack!" they're not referring to a hot chick on his arm. They're talking about Thomas. Or, to be precise, the $800 rack in his bedroom.

The Year 10 Barker College student is already working as a professional Web developer and needed a neater way to store his servers because his mum was unhappy that his room was a "complete mess".

Life's not a cakewalk when you're under the control of the school's IT department most of the time. They block Hotmail, Yahoo! Mail and Gmail, so Thomas decided to set up a Squirrelmail server on his home LAN. Every day, he gets a new IP address from his ISP, making it impossible for the school to block him.

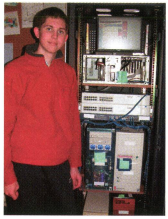
His mum likes the rack because it keeps his room clean, his sister was scared of it and asked what it was, his dad takes the opportunity to make "nice rack" jokes every time they have a guest in the house.

Even his pets like it — the cat likes sleeping on top of the exhaust vent and the dog sleeps on the bottom.

Next on Thomas' shopping list is a car, into which he plans to install a notebook PC. From nice racks to laptop action, Thomas has got it made.



**The rack: Thomas is attracting praise and admiration for his great rack.**





### HOW GEEKY ARE YOU?

**Have you wired up your car? Shared your home media library with five family members in three states? Made a 16 terabyte file server? If you've done something interesting with computing technology, *APC* wants to hear about it.**

**Email a description of your project to dwarne@acpmagazines.com.au and include photos (we need at least one of you pictured with your gear!). The most extreme geek each month wins a very cool prize and everlasting fame in *APC*.**

# 10 QUADRILLION

The number of calculations per second that the world's fastest supercomputer, currently being built in Japan, will be able to churn through — 73 times faster than IBM's American Blue Gene/L system supercomputer, the current title-holder.

## Data dump

| | | | |
|---|---|---|---|
| **2%** | Number of Internet users who use RSS newsfeeds. | Number of marketers interested in advertising through RSS. | **57%** |
| **86%** | Internet Explorer's market share in June '05. | Firefox's market share in the same period. | **8.7%** |
| **88%** | Drop in Sony's forecast profit in fiscal year ending March '06. | Drop in Sony's sales in the same period. | **2.7%** |
| **7.2%** | Unemployment in IT industry during 2004. | National average unemployment during 2004. | **5.1%** |

Forrester Research, NetApplications.com, Bloomberg, ABS

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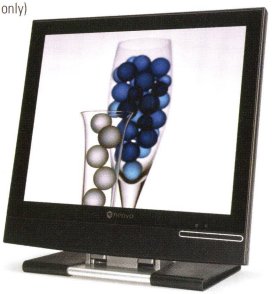
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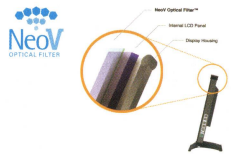
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# eBay's fraud fighter

***APC* asks the hard questions about online security and eBay's controversial refund system.**

**People who get ripped off on eBay have to go through some onerous steps to claim a refund, like getting a valuation certificate. Why is that?**

**Most of the time when a customer hasn't received an item they've paid for, they don't have to get a valuation. But we never hold the goods or inspect them. Equally, we're not experts in determining whether the goods were what they claimed to be at the time of receipt. So it's only fair and proper that we have some mechanisms in place to see if that is the case.**

**Where would someone get a valuation certificate if they received a pirated DVD from an eBay seller?**

**We work closely with AFACT, for example, the Australian representatives of the Motion Picture Association of America. They'd be able to tell you if the DVDs were genuine and perhaps provide a letter to that effect. We don't have any pushback from the community on the Buyer Protection Program. It is voluntary on eBay's part and we are showing our confidence that it's an unlikely event people will have to resort to this.**

**Despite having millions of customers and transactions, banks and telcos do extensive identity checking before giving people accounts. Could eBay use these techniques as well?**

**eBay is a marketplace, it is about bringing buyers and sellers together. We don't validate the goods they are selling — we collect information about people who register with us. We collect more information about sellers, enough to keep the known fraud rate down to less than one hundredth of 1% of items listed. Stopping fraud is not only about verifying people when they come in the door but looking at what people do while they are on the site.**

**I Googled "cremation" and got an offer of "new and used cremation" on eBay. Are you perhaps a bit liberal with your adword advertising?**

**This is not necessarily eBay. It could be people who are driving traffic to eBay — we have people who bring us new members. It isn't necessarily eBay itself buying those words.**

***Former Australian senior police Alastair MacGibbon heads eBay's Trust and Safety efforts in Australia and New Zealand. He spoke to Dan Warne.***



# We'll have no sus wusses here



Over time, there have been some fabulous tech naming blunders. A great example is the infamous "Wang Cares" advertising campaign, which when said quickly, had a connotation that caused the whole ad campaign to be pulled off prematurely.

Now Microsoft has weighed in with a double whammy. After launching its Software Update Service (SUS), it changed the name to the Windows Update Service (WUS). Soon afterwards, Microsoft changed the name yet again — to WSUS. Why all the changes? According to the official Microsoft FAQ, the service's name was changed again because: "Based on customer and partner feedback, the name Windows Update Services and the associated abbreviation (WUS) did not accurately describe the functionality and value of the product".

***Dan Warne***

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AF3245C–35/45ppm


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**Control colour:** Limit colour printing to those who need it with User Code Access. Option to also monitor and distribute costs to each user group.

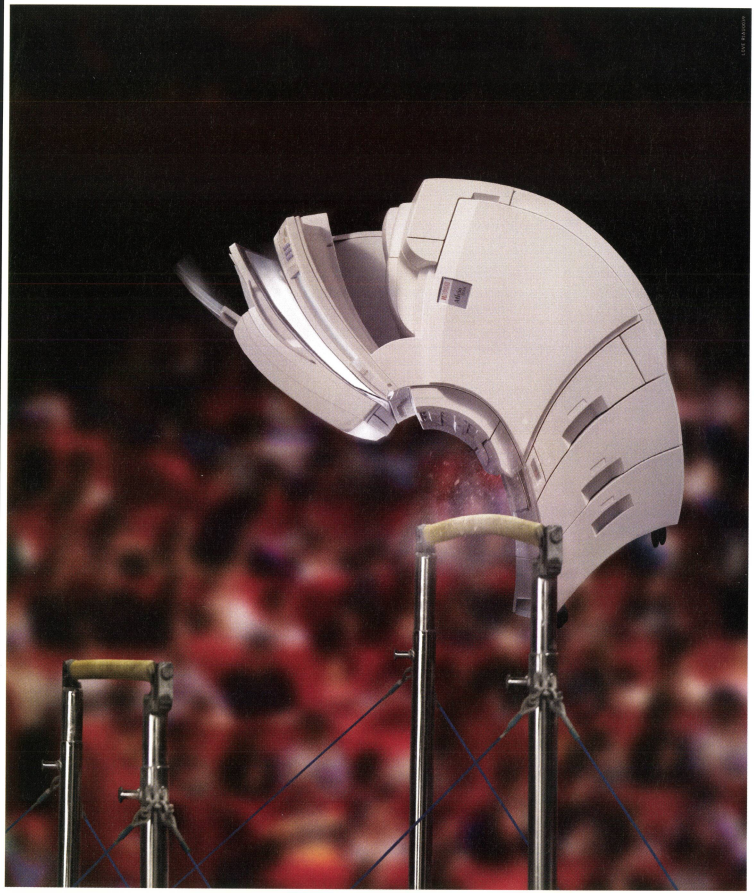
**Security:** Data Encryption and HDD Data Overwrite to prevent data theft; MFD access via standard PC user password, as well as password activated printing for confidential documents.

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QUOTE FILE



**In the next six months, we'll catch Google in terms of relevancy**

**Steve Ballmer addressing partners in Sydney in June. We'll hold you to that promise, Steve, like we hold you to the Longhorn promises.**

# Red Hat gets jumpy on free Linux

**Red Hat has taken legal action against competitors to protect its exclusive Red Hat Enterprise Linux (RHEL) product.**

Soon after RHEL's February release, several distributions like Whitebox, CentOS (Community enterprise Operating System), Pie Box and Lineox appeared, which were compiled from Red Hat sources but distributed without the hefty price tag (up to US$2,500 for the premium edition).

Red Hat claims it charges this fee for support and updates, but even so, it has demanded that competing Linux distributions remove any mention of its name and logos from the "cloned" RHEL distributions.

A legal letter sent out by Red Hat claims use of the Red Hat name in another Linux distribution "is likely to create confusion, mistake and/or deception among consumers".

Preventing others from redistributing its version of Linux treads a fine line. Red Hat acknowledges that the software is distributed under the open source licence but claims copyright over the "collective work" its distributions represent.




**Santa didn't realise his uniform breached Red Hat's trademark**

The cloned distros have been quick to comply. Nigel Jewell, a spokesperson for Pie Box, said that his company "completely understands and supports the Red Hat stance on this issue", which is "one of trademarks and product confusion, not one of licence abuse".

Jewell said Pie Box isn't in competition with Red Hat and is aimed at those users who need "a stable Linux distribution with a considerable product life time without the support and cost associated with Red Hat Enterprise Linux".

Following legal threats from Red Hat, Linux vendor CentOS (on this month's cover DVD) changed the description of the OS on its Web site to: "An Enterprise-class Linux Distribution that is based on SRPMS provided by a prominent North American Enterprise Linux vendor."

Red Hat spokesperson Leigh Day previously described clones as "good news" because they would ultimately turn users to a "company that can support their businesses".

Market analyst firm IDC predicts the worldwide market for Linux will jump from US$11 billion last year to US$35.7 billion over the next three years.

Red Hat's slice of that market is estimated at US$280-290 million this financial year and is based on the strength of its brand for support, training and consultancy.

***Tim Gaden***

DREAM SYSTEM

## Optimus keyboard

**John C. Dvorak will be weeping with joy. Despite the constant innovation in computing, keyboards are much the same as they were 40 years ago, with the addition of a volume slider here and a wireless connection there.**

**Even though the QWERTY keyboard layout is inefficient and many keys are no longer useful (like SysRq and Scroll Lock), users still stick with it.**

**But that's all about to change. Russian graphic designer Artemy Lebedev has created a prototype keyboard that uses a small OLED display in each key. This allows it to be instantly reconfigured with software. Lebedev said it will be commercially available within a year and believes that it can be made for less than US$300. A bit more pricey than the usual keyboard, but considering your digits could tickle a tiled picture of Denise Richards on your desk day in and day out, it's not so bad.**

**For people who use keyboard-heavy applications like Photoshop or games, the ability to instantly switch keyboard layouts would be very useful. For the rest of us, the 'board oozes appeal with selectable keycap fonts and high-colour program icons on keys. ROWR. Hold us back.**



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# Project Gizmo takes on Skype

## A standards-compliant VoIP program is taking on Skype... just don't feed it after midnight.

Named after the innocent-looking creatures that turned into demons in the movie *Gremlins*, Project Gizmo is angling to chew up and spit out the wildly popular Internet telephony program Skype.



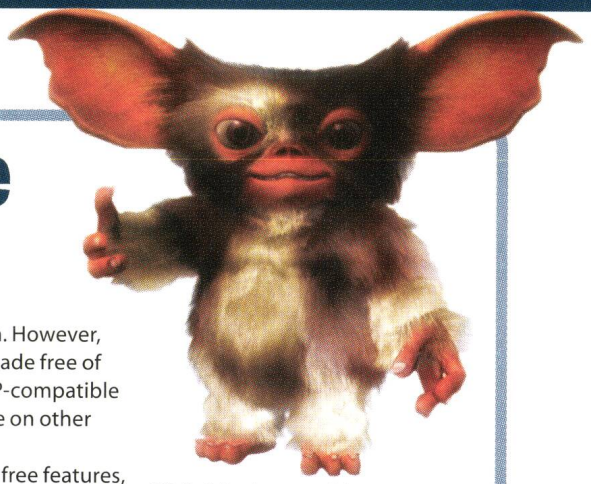

**Project Gizmo bears a remarkable resemblance to Skype, but uses open not proprietary standards.**

Criticised for using a proprietary protocol and network, Skype's users can't call people on other VoIP networks. Project Gizmo uses the open standard session initiation protocol (SIP) to connect calls while utilising an easy-to-use Skype-like interface.

However, Gizmo isn't without its critics. Created by VoIP provider SIPPhone.com, it's locked to that network for calls to the public telephone network. This is also one of the major criticisms of Skype: that there's no opportunity for competitors to offer cheaper rates on the platform. However, Gizmo calls can be made free of charge to users of SIP-compatible software or hardware on other VoIP networks.

Gizmo also offers free features, some of which Skype users have to pay for, such as voicemail (delivered as a sound file to your email address), one-click call recording, conference calls and hold music. It also does away with Skype's method of routing data through other Skype users in a P2P fashion. Instead, it sets up phone calls through a central server, which the company says allows for a greater degree of network quality and control.

Like Skype, Gizmo has close to CD quality sound when its users call each other. When calling regular SIP phone or software users, it is still compatible with regular VoIP CODECs, providing normal telephone-line quality.



**While it looks cute, this VoIP software can cover a room with green gloop.**

Gizmo doesn't have instant messaging yet, but it's working with a number of instant messaging providers to integrate Gizmo with IM programs.

Michael Robertson — creator of the Windows software-compatible Linux distribution dubbed Lindows (later renamed Linspire) and MP3.com — is the man behind Project Gizmo.

***Dan Warne***


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# The pirate song

**Some things really are too good to be true. When one bloke gets busted for linking to pirated music, the effects ripple through the entire industry. *Garth Montgomery* reports on a landmark trial.**




It was a nice enough life for Stephen Cooper. The former Queensland-based constable's private investigation business had folded with the loss of a critical government contract. But a healthy interest in computers and the Internet provided the 43-year-old with an opportunity to work from home.

Cooper described his four bedroom, single story house in Bellbowrie as "modest", but it's his castle. And in his castle, his creation slowly came to life. After a couple of years as a hobby earning around $600 a month, Mp3s4free.com was starting to make serious coin.

Some smart deals here and there meant his creation — a site with no costs that linked punters to pirated music — was raking in more than a couple of thousand dollars a month. It was money for nothing. Then his creation became his worst nightmare.

Music Industry Piracy Investigators (MIPI) had been watching the site grow to become one of the top 10 global sites for piracy. For 10 months they gathered enough information to raid Cooper's castle, and two painful years of litigation followed, resulting in his bankruptcy.

But the significance of Cooper's case goes well beyond a quick buck Internet shonk living 20 clicks west of Brisbane. It was the first test case for the Digital Agenda provisions legislated in 2000 to bring copyright laws into the digital age. The precedents set during this case will play some role in pending judgements for both Kazaa and the Swiftel BitTorrent litigators are already considering the case as similar trials get under way in those parts of the world.

The Cooper case is made more significant by finding an ISP and its employees also liable for a site that was clearly set up to exploit rampant piracy online. And all without a single music file residing on either Cooper's site or the ISP's servers. This was also a world first.

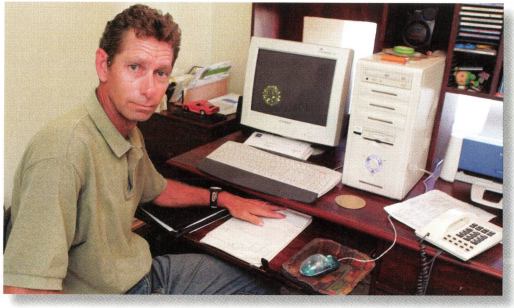
In fact, the Coopers of the world are not MIPI's target. MIPI want the big businesses making the big money from piracy. Conversations with anyone at MIPI inevitably lead to comparisons of street dealers and Pablo Escobar. MIPI wants the Escobars more than the Coopers.

But the Internet industry refuses to accept it's an Escobar, so to speak. While the peak body has cut Cooper and the ISP loose from vocal support, they still bristle at the law being so strictly imposed on illegal activity that brings in a fortune for online businesses. Whatever happens from this point on, the courts are showing a distinct lack of tolerance for mythologies peddled by dodgy Internet businesses. Namely, that online businesses, which commercially benefit from data traded on their own networks, somehow have no control and no monitoring capabilities whatsoever.

## Ahoy me hearties

Cooper's site was a booming business, according to MIPI. "It was one of the biggest copyright infringing sites in the world," said new MIPI boss Michael Kerin outside Federal Court of Australia room 18C after judgement.

The site was no amateur job. It was highly structured with hyperlinks to an ever changing array of other top MP3 sites, as well as Latest Additions, Popular



**Stephen Cooper's global music distribution business was run from a spare room in his Bellbowrie castle.**

## Mp3s4free stats

-7 million unique visitors from investigation to raid.

-100 million hits in 10 months.

-107,000 search requests for pirated music over 12 days.

-350,000 downloads over 12 days.

-Comcen "best server" logo hit over 530,000 times.

available links for top 40 songs in Australia, Europe, Billboard, UK, US and more. Downloads could be searched by artist name, song title, album title, even genre. It was everything a legitimate service such as BigPond or iTunes offered to willing punters, but for free.

Cooper's site immediately attracted users when it launched in 1998. The name Mp3s4free was pretty appealing at a time when online music fans had no legitimate options. Cooper was aware of the legal backdrop to what he was doing. His site posted warnings that it was your responsibility if you went for it.

"When you download a song, you take full responsibility for doing so. We are just providing links to remote files."

Even at the time it looked like a contrivance to show some acknowledgment of the law while trying to exploit its shortcomings. As he ignored the stream of cease and desist notices sent from various copyright representatives, his site disclaimers intensified.

"This site only provides links to the according sites and no songs are located on our servers. We are not responsible for any damage caused by downloading these files, or any content posted on this Web site or linked Web sites."

This would form the basis of Cooper's defence. He might be profiting from Internet infringement, but he was just linking. And on every page was a Comcen logo. The company had a commercial agreement with Cooper. They hosted Mp3s4free in exchange for exposing their live logo on the highly trafficked Web pages.

Cooper went the extra mile for his gracious hosts and added "Best server" beneath the logo. It was a great endorsement from a site that received 107,000 search requests for pirated music, and served 350,000 downloads over the 12-day period that forensic investigators watched the site while gathering evidence.

Cooper didn't have the files on his site, but he arranged where they'd be. Click on a link at Mp3s4free and music would download from a remote site directly to your PC. No pirate music files would touch Cooper's site or Comcen's servers.

It was a well-considered setup that would test the mettle of Australian digital copyright laws. It was obviously illegal to host pirated songs on your Web site, which makes good money from ad revenue. But would it be illegal to simply arrange for the songs to be on another server overseas and merely link to the files?

Exactly three years prior to being raided, Cooper signed an "Affiliation Agreement" with Internet Music Corporation to receive revenues derived from advertising and new services to his Web site. On 18 October, 2000, Cooper entered a similar agreement with eFront Media Inc, which would give him a share of referring his customers to a range of ad banners, buttons and text links on the site.

By December 2000, Cooper and Comcen were business partners. He paid the small ISP $65 for three months of standard Internet access. Meanwhile, advertising brokers were queuing up to sign Cooper's site. Cashsponsors.com signed Mp3s4free to join its affiliate program in February 2001.

Momentum was gaining for Mp3s4free. A site with no stored content, a modest development cost, and the barest of Internet service fees was becoming a decent business. Traffic built, as did advertising revenue. By March 2001, Cooper realised the benefit for Comcen. He emailed Comcen network administrator Chris Takoushis and offered to have the Comcen logo on his site in exchange for free hosting. After looking at the log files, Takoushis emailed back three days later to seal the deal. Comcen would waive hosting fees for Mp3s4free in exchange for a hyperlinked logo.

Revenue for Cooper's site poured in. By June 2001, "Play Casino" ads were a fixture of the site after CasinoTraffic.com opened an account for monthly payments for advertising on Mp3s4free.

The site was going so well that Cooper's entrepreneurial spirit urged him to expand his offering to users. He hired a US-based programmer to create a database to manage and search for files on the Web site.

Comcen's growing success was running in parallel to Mp3s4free. What started out as a PC rental business in 1993 was now a fast-growing ISP with 4,500 customers.

The arrangement with Mp3s4free was working out

tremendously well for Comcen. Curious punters clicked on the Comcen logo to see what the "best server" had to offer. Log files presented by expert witnesses show the Comcen logo on Mp3s4free was clicked more than 530,000 times during the 12-day period of investigation.

And that's when the trouble began. Complaints poured in from the Australian Society of Composers, Authors and Publishers demanding investigation into alleged misuse of copyright. Letters of warning had already been binned by Cooper from the copyright owners. The heat intensified from copyright stakeholders. They demanded that the industry peak body, ARIA, do something, anything. The dogs of MIPI were unleashed.

Former MIPI boss Michael Speck ordered forensic investigators to track downloads made from Mp3s4free from December 2002 to October 2003. More than 107,000 searches for unlicensed music occurred over this period of recording log files. And more than 350,000 downloads of artists — including Jet, Eminem, Beyonce and others — were performed during the 12 days.

His team gathered enough evidence to ask for raid orders from the federal court for alleged copyright authorisation.

## Knock, knock, it's MIPI

On 17 October, 2003, federal court judge Arthur Emmett gave the music industry civil court orders to raid the Camperdown premises of Comcen in NSW.

MIPI forensic investigators and lawyers were accompanied by a court-appointed independent solicitor to Comcen. It was an eight-person outfit in a small, open-plan office. The MIPI team had barely introduced themselves when Comcen's Con Georgiopoulos asked, "Is this about MP3 files?"

Comcen boss Liam Francis Bal quickly ushered the investigators and lawyers into a crowded conference room. Georgiopoulos was Bal's right-hand man and keen to defend his employer in the heat of a raid.

"We know the site [Mp3s4free]," he told MIPI lawyers. "We have been telling them to take it down, but they say that because they are not hosting the files that there is no problem."

The investigators began imaging drives and seizing records from the Comcen servers.

MIPI's Speck told his team to get all the data related to monitoring Internet traffic and user log files. The request was brushed off by Bal. "We don't keep records."

Bal told MIPI lawyers that all an ISP does is serve streams of data. Anyone could be doing anything on the network and an ISP wouldn't know. All they do is provide a connection. There were no user log files or traffic monitoring. Behind Bal was a 100cm plasma screen monitoring real-time network traffic. Speck asked the front desk receptionist to print it off. Forensics investigators would discover a plethora of log files retained by the small ISP. Fifty boxes of 110,000 pages of log files were tendered as evidence. Among them were files named "mp3_ftp_logs", "mp3log", and "Mp3s4free.net-access_log."



Despite the obvious business relationship Comcen had with Cooper, there was a sense that it was only vague at best. Bal would argue that he didn't even know about it and had deferred those kinds of dealings to his network administrator, Chris Takoushis.

Takoushis said he knew nothing and never looked at either Mp3s4free or the activity of any site hosted by Comcen.

The music industry didn't believe the pair and joined them personally — plus the company — to proceedings against Cooper. Analysis of the email server revealed frequent communications between Takoushis and Cooper.

Prior to the trial, Takoushis was ordered to hand over all personal communications with Cooper that took place on his work PC. As the trial rapidly approached, MIPI litigators realised that Takoushis still hadn't handed over certain critical documents believed to be on his work computer. When MIPI returned to Comcen, Takoushis' computer was gone.

Speck was informed that all Comcen employees had system upgrades and that Takoushis' PC had been donated to a charity. "I said no problem, which charity and I'll go and pick it up," Speck told *APC*.

"They told me it was in Africa. That they gave it to some church that had a relationship with African charities."

As Speck prepared to go to Africa, he checked the shipping manifests with port authorities. The machine hadn't yet left the docks and was seized by MIPI.



**Music piracy litigator Michael Williams and former MIPI chief Michael Speck.**

**13 AUG 1993** — Comcen registered with ASIC by Liam Francis Bal.

**1998** — Mp3s4free launched by Stephen Leslie Cooper.

**SEP 1999** — Chris Takoushis joins Comcen as network administrator.

**17 OCT 2000** — Cooper affiliates with Internet Music Corporation for ad serving.

**21 DEC 2000** — Mp3s4free domain and hosting transferred to Comcen.

**5 FEB 2001** — Cooper affiliates with Cash sponsors.com.

**27 MAR 2001** — Cooper emails Takoushis for free hosting at Comcen in exchange for a hyperlink.

**30 MAR 2001** — Takoushis emails back. It's a deal.

**6 JUN 2001** — Play Casino signs long-term ad deal with Mp3s4free.




**Cooper's castle (left), the highly-organised and searchable Mp3s4free (below).**

Forensic examination of Comcen's head network administrator would eventually humiliate both Takoushis and Bal. Evidence of Comcen's knowledge and involvement with Cooper was now mountainous. The ISP's ability to monitor users, traffic and content was at odds with testimony from Takoushis and Bal.

## Not this ISP

Bal quickly sensed he and his company were in deep trouble. He liquidated Comcen and registered a new company with ASIC called E-Talk. He transferred 3,000 of Comcen's 4,500 customers to E-Talk and told music industry litigators that Cooper was only a Comcen customer, but E-Talk was a new, clean company that should be left out of this mess. E-Talk was joined to the proceedings.

Justice Brian Tamberlin was scathing of the E-Talk/Comcen boss at judgement. Bal maintained that he knew nothing about Cooper or his infringing site. Georgiopoulos had already blurted at the raid that Comcen knew about the site. And Takoushis testified at trial that he'd have notified his boss about free hosting arrangements offered by Cooper. But Bal was defiant. He told the court his company hosted 2,000 sites and, prior to the raid, had never visited Mp3s4free.

The judge ruled that this was as preposterous as it sounded. Under cross-examination, Bal admitted Mp3s4free was in the top 30% of traffic-generating sites for E-Talk/Comcen. Given the company provided Cooper with free hosting because they benefited from the traffic his site attracted, Justice Tamberlin ruled it was inconceivable Bal could not have understood the nature of the site.

"There is not much point in giving free Web hosting to an operation that does not generate a significant number of hits," Tamberlin said. "The obvious commercial course would have been for a decision maker at E-Talk/Comcen to visit the Web site to ascertain whether it would attract high traffic to Comcen."

Justice Tamberlin also questioned how E-Talk/Comcen would know Cooper was honouring his free hosting agreement with the Comcen link if no-one ever checked his site.

"I do not accept that Bal and Takoushis were unaware of the contents of the site, or that they failed to take any steps to inform themselves as to the volume of traffic that the Web site would likely attract."

## Just a techie. Uh-huh.

Chris Takoushis was like any other employee: keen to show his boss he was clever and could help raise revenue. Email correspondence between Takoushis and Cooper showed that Takoushis was instrumental in the setup, maintenance and operation of Mp3s4free. He was the main point of contact for Cooper to E-Talk/Comcen and they were in regular correspondence about the site.

He had studied an IT course at a NSW TAFE until September 1999 and was immediately employed by E-Talk/Comcen. Takoushis had quickly impressed his boss and was not only a leading techie at the small company, but also trusted with hosting relationships and other revenue-related functions.

Takoushis shared Bal's defiance about what was happening in the federal court. There was a sense of belligerence during his cross-examination. Takoushis pretended he didn't know what the term "Webmaster" meant, and that he did not know what "MP3 files" were, and had no idea what a Web site called Mp3s4free could indicate.

The judge was not forgiving. Like Bal, Justice Tamberlin would rule that Takoushis' credit as a witness was limited.

"Takoushis was an evasive, non-cooperative witness who did not address questions directly," Tamberlin said. "One matter which impacts adversely on his credit is the extreme position that he took to the effect that he paid no attention to the domain name of the Web site and drew no inferences from it."

The judge didn't believe that no-one at E-Talk/Comcen knew about the contents of Mp3s4free. Worse, using this notion as a defence was deemed "unreasonable conduct" by Justice Tamberlin.

"Where a host is on notice of an irregularity and deliberately turns a blind eye then, in my view, there are additional factors called into play beyond merely hosting the site.

"Bal and Takoushis did not intend to take any action in relation to the Cooper site having regard to the perceived substantial financial advantage that E-Talk/Comcen derived from hosting the Cooper site."

## Never touched the stuff

Music industry investigators provided evidence that Cooper had arranged access to popular sound

**7 JUN 2001**
E-Talk registered with ASIC by Bal.

**APR 2002**
Comcen transfers bulk of customers to E-Talk. Nothing outwardly changes.

**13 MAY 2002**
Cooper commissions US programmer "Thanesh" to build database to manage and search files on Mp3s4free.

**31 AUG 2002**
Bal appoints voluntary liquidator to administer Comcen as complaints about Cooper site are made.

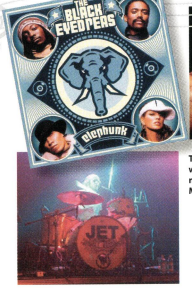
**14 NOV 2002**
Cooper receives the final of numerous letters from ASCAP offering a lawful licensing agreement.

**DEC 2002**
MIPI surveillance and investigation begins.

**17 AUG 2003**
Raid on Cooper's Bellbowrie home and Comcen's Camperdown office.

**24 AUG 2003**
Mp3s4free shut down.

**25 AUG 2004**
Trial starts. One full week, then adjourned for another full week of hearings from 7 February 2005.






**The Black Eyed Peas, Eminem and Jet were just some of the artists whose music was illegally downloaded by Mp3s4free users.**

recordings with owners of the files and other linking services. Forensic experts suggest that the prospect of getting access to files in the same order and structure as presented on Mp3s4free would make Lotto odds look decent.

An October 2000 study by University of California academics Peter Lynan and Hal Varian showed there were 550 billion documents on the Web, of which 95% were publicly accessible. Web pages were then growing at 7.3 million per day.

Given the volume of data online, the prospect of lucking on to the exact file requested through Cooper's Web site seems implausible without a guiding hand.

The judge disagreed. Justice Tamberlin ruled that Cooper had not "made available" the music by linking to locations believed to be exclusive. The judge was convinced that users could have conceivably got the music by directly typing a URL in a browser, or by accessing Google to get to the same location.

"Getting access to illegal files from Google is possible," said one litigator. "But not the files on Cooper's site. These files were strategically organised and placed by Cooper. He asked his users to send in songs, and he asked others for [server] space to store them so his customers would never be disappointed."

Litigators were astounded at the level of contrivance in Cooper's business. "He was smart enough to not have the gear on him when he got caught. But he solicits the gear, hides it behind a tree, tells people about the tree, gets paid for telling, and then says 'I only tell people where they can get illicit product'. It just doesn't stand up in the real world. If this were an offline crime, you'd cop an extra lagging for being such a smartarse."

The judiciary would ultimately frown on Cooper. It was absurd to think it could be viable or legal. Cooper more than sensed it. Like other Internet businesses now facing courts, Cooper declined to defend his business model to a judge. He refused to take the witness box and it was rapidly emerging that an online music distribution business without the copyright owners' consent was little more than stealing.

Cooper's legal team tried to further mitigate his role as merely an intermediary. His barristers told the court that he could not possibly control whether music remained on the Internet or remote Web servers.

Justice Tamberlin ruled that the Digital Agenda Act was clear that any Internet business with "sufficient control of their own Web site to take steps to prevent the infringement" must do so.

Cooper's defence team pointed to section 112 of the Copyright Act that affords protection to ISPs and others for authorising copyright if they just provided the facilities. Justice Tamberlin shot it down, saying Cooper had clearly sought out infringing music and encouraged users to download it from his site. His disclaimers were further proof he knew the material was illegal.

Until now there had been no such definitive ruling and it immediately detonated worldwide. *APC* understands a number of tier one law firms in London representing ISPs and Google quickly set up meetings with the UK Government to determine its own position in light of the new ruling.

It was the first clear indication that ISPs and Net businesses with technical control over the service they offer must take steps to stop illegal activity when duly notified. The ruling was also in line with the Free Trade Agreement Safe Harbour provisions and the still unratified ISP code of conduct. Both FTA and Digital Agenda provisions protect legitimate Internet businesses from liability arising from illegal content on their systems if they comply with a Take Down notice.

Justice Tamberlin dismissed E-Talk/Comcen's application for protection under the FTA provisions. The company tried to have it both ways. On one hand, it argued that it never noticed what Mp3s4free was all about, with Bal admitting under cross-examination that he was indifferent to his clients' content and didn't see he had any responsibility for it.

On the other hand, the FTA requires ISPs to have a policy that terminates repeat infringers. The company, by its own admission, failed to have any policies and Justice Tamberlin plainly noted it in his judgement.

The judge also noted that E-Talk/Comcen received financial benefit from the infringing activity. "[E-Talk/Comcen] obtained free advertising on the Web site…[and] did not act expeditiously to remove or disable access from the hyperlinks [when] circumstances made it apparent that copyright material was likely to be infringed."

Still, the Internet Industry Association (IIA), some academics and self-appointed commentators were quick to downplay the ruling as irrelevant because the Cooper case was "unique". The noise from naysayers was indicative of how polarising the entire debate had become between copyright owners and supporters of a more liberal Internet landscape.

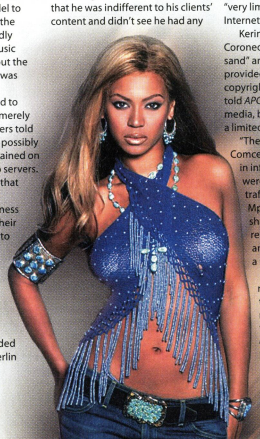
### It's the Internet, stupid

A bitter skirmish broke out between MIPI and the IIA on daily news sites. MIPI boss Michael Kerin declared it was a significant blow to Internet piracy. IIA boss Peter Coroneos told ZDNet the ruling had "very limited implications on the Internet industry".

Kerin hit back, accusing Coroneos of having his "head in the sand" and it was about time the IIA provided guidance to ISPs about copyright violation. Coroneos told *APC* it was all a beat-up by the media, but reiterated the ruling set a limited precedent.

"There was evidence that Comcen was knowingly involved in infringement because they were aware of the volume of traffic and co-branded with Mp3s4free and had revenue sharing. That's a changed relationship compared with an ISP running traffic across a network".

Coroneos has always represented ISPs as willing to take down infringing material when notified. "It's when they choose to do nothing they end up in hot water."



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# The verdict

**The offence:** Section 85(c) Copyright Act. "Communicate to the public" in the Copyright Act means "make available online or electronically transmit".
**The prosecution:** Hyperlinks on Cooper's site led to direct download of pirated songs from an offshore server.
**Verdict:** Not guilty. The remote servers "made available" and "electronically transmitted" the songs, not Cooper's site directly.

**The offence: Section 22 Copyright Act. The person responsible for the communication of copyright must have permission.**
**The prosecution: Cooper's control of links from Mp3s4free to precise files made available means he is responsible for the communication.**
**Verdict: Not guilty. The power to control links is not the power to determine the content on a remote server communicating with users.**

**The offence:** Section 101 Copyright Act. Authorisation of copyright infringement.
**The prosecution:** Cooper had the power to prevent copyright infringement, had an existing relationship with owners of remote servers providing pirate music, and did not take reasonable steps to avoid his users accessing these.
**Verdict:** Guilty. The Web site is clearly designed to facilitate and enable infringing downloading. Cooper has authorised copyright infringement by users and the owners of remote Web servers.

**The offence: Section 103 Copyright Act. Infringement by sale, hire, or exposure by trade in public.**
**The prosecution: The Web site is analogous to a shop. Cooper exposed for sale by way of trade the music files on his Web site. He benefited financially from advertising and sponsorship.**
**Verdict: Not guilty. The commercial benefit to Cooper was collateral. There is no sale between Cooper, the users, or owners of the remote Web site.**

## E-TALK/COMCEN CHARGES

**The offence:** Section 101A Copyright Act. Communication, authorisation and exhibition or distribution for sale.
**The prosecution:** E-Talk/Comcen had the power to prevent copyright infringement and failed to exercise.
**Verdict:** Guilty. E-Talk/Comcen hosted the site, provided Internet access, and could have taken it down any time.

It's a position that has taken some time to come to after the IIA fiercely resisted any notion of responsibility for user activity on its network. Negotiations with the music industry broke down about appropriate ISP action, and the IIA's long-awaited code of practice remains unratified.

Coroneos insists ISPs are now happy to deal with copyrighted or otherwise illegal content. He wants to avoid the music industry's rampant litigation and portrays Comcen as an anomaly.

"Comcen was guilty because of the nature of their relationship. The law states that their actions were not reasonable because they'd done things that were above and beyond what an ISP would [ordinarily] do.

"I'm aware of no ISP in Australia that would ordinarily engage in a relationship with a Web site owner. They're just not interested at all."

Music industry litigators dispute this and say it is common practice to seek out relationships with high-traffic Web sites.

"ISPs are always on the lookout for Web sites attracting large numbers of customers," said music piracy litigator Michael Williams. "They either want to build up enough traffic and customers to make them attractive for sale to bigger ISPs, or else simply save on network costs by caching content.

"An ISP's business only grows as traffic and users grow. It's a bit rich to pretend they want to limit their bandwidth, traffic and users when the whole business model is geared towards growing it."

The IIA has had two conflicting arguments for years. The first: we can't be held responsible for user activity or content on our networks because we have no control and no user activity data.

The second: we'll take down content and hand over detailed user activity voluntarily when notified, but if you hold us accountable for any of it, access charges will increase.

On cue, Coroneos trots them both out, depending on the questions asked. Do ISPs make money from attracting traffic to their networks? "More traffic costs the ISP as more bandwidth is used," he says.



**Michael Speck — disappointed he missed out on an African safari.**

What about caching content? "It's true ISPs try and hold content locally. But if you've got POPs nationally, it doesn't help if you cache content in Sydney and someone in Perth wants it. We wouldn't want a situation where we're held liable for content cached. The loss of economy of scale would lead to higher bandwidth costs [for consumers]."

If ISPs are increasingly getting into bed with Web sites attracting huge traffic, Coroneos says this case highlights the perils. "It's not clear to what extent it's commonplace, but it is clear it's risky if the content is unlicensed."

The argument that ISPs derive no financial benefit from greater use of bandwidth is difficult to maintain. Print and broadcast media are saturated with advertising that urging people to move to broadband.

There's no dispute from either Coroneos or any ISP that they benefit from customers using more bandwidth. MIPI claims more than 20% of ISP revenue is derived from peer-to-peer traffic of mostly illegal songs and movies in the form of bandwidth-heavy files.

Songs captured and tendered as evidence against Comcen and Cooper were up to 8MB in some instances. The ISP certainly pays for it upfront, but it's all part of the glorious package offered to users in the form of capped downloads.

### Precedent or palaver?

Kim Weatherall is the associate director of the Intellectual Property Research Institute of Australia located in the University of Melbourne. He says this trial signalled a problem for Internet businesses capable of knowing that an infringement is occurring.

"In circumstances where a person in Australia has a site linked to material overseas, this case suggests liability. But it depends on the facts, such as how aware you are of it and what control you have over it [as a Web site owner].

"The case doesn't hold that all linking to copyright material is an infringement. But in circumstances where there are active links to copyrighted material that you're aware of, that could constitute an infringement."

On any interpretation of the judgement, Cooper and E-Talk/Comcen had been crucified by the federal court. Justice Tamberlin summed up Cooper as someone who authorised copyright infringement by allowing users to access his site and the remote servers holding pirated music. And he would not get the legislative protection designed for Internet businesses that unknowingly allow access to illegal online content.

Exactly how much money Cooper was making remains unknown. By refusing to testify during the liability hearing, his bank account details would not be revealed until the damages hearings. *APC* understands the now-bankrupt Cooper made between $65,000 and $100,000 a year from ad revenue on a site that cost nothing to run.

Equally, it's unknown how much Comcen made from referrals from Mp3s4free customers and the flow-on effect of spiked traffic from the popular site. This too is also expected to be revealed during the damages hearing later this year.

Either way, the effect on the Internet industry is profound as the courts indicate what's acceptable from Internet businesses with regard to illegal content.

***Go to apcmag.com for a range of court documents including opening and closing statements, affidavits, the judgement and more.***

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# Dealing with aliens

**One reader felt like he was speaking in an alien language each time he tried to find out where his new PC was. *Dan Warne* investigates.**




Dear Watchdog,
I want to express my frustration in dealing with Alienware. I ordered a PC on 6 May, 2005 and two months later I still hadn't received my PC.

Originally, my confirmation email said the PC would be delivered on 24 May. That date came and went and I called Alienware to confirm that my PC was on its way. They told me it wasn't and that the actual date would be 27 May.

The 27th passed with no delivery. I called again and they apologised that there had been faults in some power supplies of the PCs they built and they had to order replacements. They couldn't give me a new delivery date.

When I asked why they hadn't called to let me know about the delays, I was told it was "not company policy".

I called a week later to be told that they had just moved premises and couldn't find my order.

"Call back in a week."

When I called as instructed, I was told that my PC was due to be shipped on 10 June but the Queen's birthday holiday would probably delay it. The Queen had her birthday but I still had no PC. Alienware then said it was waiting on the memory for my PC.

"Call in a week to find out your new delivery date."

I called the next week and was told my PC was *due to be built* on 21 June and would be delivered that week. That week's excuse was that Alienware PCs were "extremely popular" and they couldn't build them fast enough.

I really didn't want to hear the next excuse so I phoned Alienware to cancel my order. At 9.20am I got a recorded message saying they were only open 9.00am to 5.00pm. Finally I got someone on the phone at 9.45am and was able to cancel.

***David Wells***
***Collingwood, Vic***

## case of the vapourised warranty

Dear Watchdog,
I purchased an unbranded notebook last year from a company called CFS Computers in Sydney. Five months later, the battery wouldn't charge and shortly after that the whole unit stopped working.

I notified CFS of the faults in November 2004 and sent the unit for warranty repair in December. After a long delay, its response was that there was "some kind of moisture on the board". The faulty battery was apparently ignored. A $1,100 quote was provided for the replacement of the main board. I refused the quote and asked for the computer to be returned. It took four months from the date I sent it to them to get my faulty notebook back.

When I did my own inspection, I discovered a sticker left by the technician on the motherboard, stating "faulty video chipset". This would have been covered by warranty but condensation would not have been. To me, this seems like warranty avoidance.

Evidently, residents of high-humidity areas like Darwin or Cairns can't use CFS Computers and expect warranty coverage. The company didn't tell me this when they sold it to me.

Needless to say, I would not recommend *APC* readers buy a computer from CFS.

***Karl-Dieter Oelrichs***
***Parap, NT***

Dear Watchdog,
CFS does not avoid warranty obligations. Ninety percent of our warranty work is turned around in less than 24 hours.

All electronic devices should be used in a certain environment and the manufacturers' instructions for care and operation should be followed. In the user's manual it clearly states: "Do not expose to excessive heat or direct sunlight. Do not leave it in a place where foreign matter or moisture may affect the system. Don't use or store the notebook in a humid environment." Several pages cover these issues and are not in small print – they are very clear and have illustrations.

The notebook in question was returned to the manufacturer, Protac, on 20 January, 2005. Protac advised there was evidence that the notebook was exposed to moisture, causing a chip to be burnt on the main board. If they were to replace it, there would be a charge for the main board and a service fee. Another notebook sent at the same time was repaired without question.

CFS sells most brands of notebooks, including HP, Compaq, IBM, Acer and BenQ. When a client comes in with a problem, we help them with the process of getting it repaired. However, if the client had gone directly to Protac, the outcome would have been the same.

CFS has never had a complaint against it with Department Of Fair Trading or the ACCC in six years of operation. We do not avoid warranty obligations, and in fact we go over and beyond our responsibilities.

***Fred Khalil***
***CFS Computers***

**CFS has a point about electronics needing to be used in a certain operating environment, but it's ridiculous to suggest that people who live in humid states like Qld or NT can't use a notebook computer and retain their warranty. If there is a genuine problem with notebooks failing due to humidity and condensation, it's time manufacturers devised a technology to solve the problem. Where would the shipping industry be today if it had simply accepted that metal hulls would rust through due to sea water?**

## retailer speaks out on ipod returns

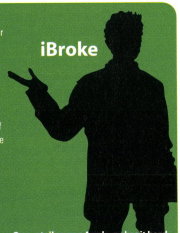
In "Pop your Pod in a Postpak, mmkay?" (*APC* July, page 24), Simon Jaeger was furious that David Jones refused to exchange his dead-out-of-the-box iPod on the spot. Instead, he was required to post it back to Apple. The company has since amended that policy to allow retailers to handle the process, but all they can do is post the iPod back on the customer's behalf.

Queensland-based Apple retailer Graham Fountain says shops have their hands tied. "Apple makes it effectively impossible for us to meet our legal obligations," he explained.

"With any other brand of product, if the customer gets home and finds it faulty, we can provide a refund or exchange, then pursue our supplier. Apple doesn't allow this, insisting that end-users return faulty product directly to them. As a "concession", Apple kindly allows us to return 1% of the value of the previous month's purchases as faulty. This means that if in the previous month we received less than 100 of a product, we cannot return *any* faulty units to Apple without sending them back for assessment first. The iPod failure rate is far higher than 1%, and margins are less than 5%, so although the law requires retailers to do one thing; Apple's policy requires us to do differently."

Apple Australia marketing director Rob Small, responded, in part: "We are not putting any restrictions on our channel partners to allow them to meet their legal obligations. We have a very efficient return process for customers who find a fault with their iPod, and that is to return it to Apple for repair or replacement. In some instances it is more appropriate for the mass merchants (such as Myer or David Jones) to replace an iPod if it is found to be faulty at the time of purchase, in the name of good customer service. We make provisions for our mass merchant partners to return a percentage of their purchases on Apple to allow for genuine hardware faults."

Small argued that many iPods that appeared "dead" could actually be revived with a software reset or other minor procedure and Apple retail outlets were able to help customers on the spot in many cases. "If a machine is genuinely dead, it can be returned for replacement," he said.



**One retailer says Apple makes it hard for them to meet warranty obligations.**

**Watchdog asked Alienware why it had been impossible for David to buy a PC from them.**

Dear Watchdog,
Alienware would like to apologise for Mr Wells' experience and acknowledge the legitimacy of his claims. We pride ourselves on our award winning customer service and treat every concern seriously. We have supplied thousands of customers both here and internationally with outstanding products and service.

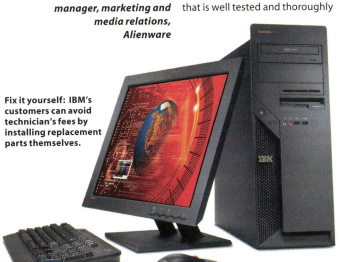
Mr Wells' order was indeed affected by the delayed shipment of memory and the water-damaged power supplies. Alienware uses only the most advanced technologies in our systems, and it can be difficult to source large quantities of high performance parts.

We attribute the series of other delays Mr Wells experienced to our expansion and the relocation of our prime manufacturing facility in Adelaide. As with any company that undergoes rapid growth, we had been encountering issues with infrastructure and internal communications. Though regrettable, this accounts for the imprecise information provided to Mr Wells, and the short misplacement of his order.

Our new production facility — one of the largest in the Pacific region — will allow us to increase volume and meet the unprecedented demand for Alienware products, and better fulfil our long term commitment to Australia. The appointment of several new key team members has also ensured our vital internal stability.

We apologise once again to Mr Wells and any other customers who may have experienced delays. We ask our loyal customers to be patient while our new facility is established, and reassure future purchasers that their expectations of performance, dependability and service will not only be met — they will be exceeded. We look forward to sharing the Alienware experience with you shortly.

***Luke Flesher***
***manager, marketing and media relations, Alienware***


**Fix it yourself: IBM's customers can avoid technician's fees by installing replacement parts themselves.**

### BIG BLUE COMES THROUGH

I constantly read never ending disaster stories about the PC industry in Watchdog and thought I'd share a story with a happy ending.

I used to be under the impression that the IBM acronym once stood for "I've Been Misled". However my faith in them was recently restored.

When my parents wanted to buy a PC, I chose to get them something reliable. Speed and fancy features didn't matter. I decided to give an IBM desktop a try. I hadn't read any horror stories in Watchdog about IBM.

I had heard that the company has a reputation for not using "bleeding edge" gear but stuff that is well tested and thoroughly checked. This was ideal for my requirements.

The PC came standard with a three-year parts, and one-year labour warranty.

In the second year of warranty, the system stopped powering up. When I rang IBM, they helped me diagnose the problem and sent me a new motherboard. They asked if I knew someone who could install it. "Er... yes," was my reply.

I then discovered it was actually the CPU at fault. Within two business days, IBM sent me a new CPU. Then there was a BIOS incompatibility issue, but IBM was able to diagnose that over the phone too and told me how to install it.

I was impressed that IBM trusted my ability to diagnose the PC, and the clear instructions that were checked and double-checked on the phone.

Honestly, I was expecting the run around ("you need to use our pricey technicians or your warranty will be voided"), but instead, they trusted me as a customer who could either fix it himself or find his own technician.

It's good to actually experience such professional service from an IT company. I will now consider IBM servers when I decide to upgrade because I know the level of service I will receive.

***Neal McArthur***
***Lawnton, Qld***



Dan Warne

# What PC users really want

## Hold the "concept PC" production lines!

***Dan Warne*** **has some brainwaves for PC makers.**

You know what pisses me off about computers? It's the little things. Every computer manufacturer in Taiwan is hard at work cramming PCs into Mac Mini cases, but we're all still dogged by turn-of-the-century hassles with our PCs. Here's what I'd fix.

### 1. Foolproof connectors

USB ports are tucked away in little recesses in the front of cases, designed so you can't tell which way is up. You wriggle it in for a couple of seconds, figure out you must have it the wrong way up, so you turn it over and wriggle it some more, until you finally realise you must have had it the right way up in the first place. It turns out that the people who designed the nine-pin serial connector (which can only plug in one way) had it right all those years ago.

### 2. Cords consolidated

Sure, USB and FireWire have cut down on the number of power cords needed for small, low-power devices. But printers, monitors and other essential peripherals still need power cords, which inevitably outnumber the available number of power points. The power board should be built into the computer, and data should be delivered over the same cable.

### 3. Screw screws

How many man-hours have you wasted trying to get that lost screw out from under the motherboard? Big PC vendors like Dell and HP have shown that it's possible to make a screwless computer chassis. It's time for the whole industry to move on. And while you're revolutionising, make swing-open PC case doors standard, too.

### 4. Slot-load hard drives

Apply the toner-cartridge design to hard drives. You should be able to slot them in from the front of your PC, securely lock 'em in place and start using them. It's astounding that hard drive makers haven't clued in to the fact that they could sell hard drives at Woolworths next to CD-Rs if they did this.

### 5. Reinvent the interface

Fundamental configurators like BIOS setup screens are still phenomenally arcane. It's understandable that it's difficult for the industry to move on to the next generation "EFI" firmware that will eventually replace BIOS, but there's no excuse for BIOS makers not to upgrade their interface to include detailed help and use standard navigation methods.

### 6. Snap, crackle and pop

Has no engineer noticed how awful the sound is from the headphone jack on most cases? It's because the cable leading from the motherboard to the jack is totally unshielded and picks up interference from the components all around it. It's a small flaw that has subjected millions of people to music with added hard drive noise.

### 7. Broken URLs

This deserves a spot in any list of craptacular design. It's the inability of email clients to handle URLs that run longer than one line in an email. You click the URL and only the first 72 characters are passed to your Web browser, which inevitably returns a "page not found" error. The workaround? Cut and paste the two lines into Notepad, recombine them and paste into your Web browser. The crazy part is that there's a documented technical standard for handling URLs that flow longer than two lines, but most email programs just haven't implemented it.

*Send your gripes with computers and ideas for fixing them to epinions@apcmag.com.*

# Is Windows x64 really a Longhorn Beta?



Mary Jo Foley

**When Microsoft rolled out Windows XP x64 this past autumn, company brass saluted the release as the must-have accessory for every geek's souped-up Acer red Ferrari notebook (or any other 64-bit desktop).**

**But since then, Microsoft has done little to promote the newest member of the Windows family. It's almost as if Microsoft doesn't really want customers to try out the platform at all.**

**Microsoft has been begging developers to write 64-bit drivers for the past couple of years. But that plea seems to have fallen on deaf ears. There are still relatively few drivers that support XP x64, outside of the basic drivers that ship with the operating system. I'm not talking specialty drivers here. Many users in search of a 64-bit driver for common sound cards, printers and scanners are still coming up empty-handed.**

**In fact, some Microsoft officials have acknowledged publicly that one of the main reasons the company decided against releasing Windows XP x64 as a retail package was the ongoing lack of drivers. Microsoft is counting on system builders to go out and scour the planet for the necessary drivers and preload them on 64-bit systems.**

**But restricting the distribution mechanism to OEM box builders is only hurting the XP x64's potential to go head-to-head with desktop Linux, Solaris and other operating system releases that have been 64-bit for a while now.**

**Microsoft also didn't do the XP x64 platform any favours with its "free upgrade" offer, announced in May. What originally sounded like a good deal — the ability to move from the 32-bit version of Windows XP Pro that came preinstalled on their PCs to XP x64 — ended up a not-so-good one. Users who took advantage of the offer are risking voiding the factory warranty on their PCs, Microsoft later warned, and some PC builders took the opportunity to add a hefty "disk media, postage and handling" cost on top of Microsoft's "free" price tag.**

**Is Microsoft still serious about selling the XP x64 platform? Or has XP x64 devolved into little more than a dev kit for Microsoft to try to get developers to write 64-bit drivers and applications as a practice run for Longhorn? Inquiring minds are starting to wonder...**

*Mary Jo Foley is the editor of Microsoft Watch (**www.microsoft-watch.com**). She sounds off exclusively for APC on Windows each month.*




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# The difference between a Web camera and an IP camera

**The popularity of remote video-based monitoring is increasing, along with the spread of PC-based video messaging and live Webcams. However, these applications use different video camera technologies, as explained below.**

## Web camera

Web cameras connect directly to a PC and are generally used for video messaging, to update images on a Web site, or to monitor a part of the house from one PC only.

A Web camera makes the video available to a single user on the PC the camera is connected to, usually via USB or FireWire cable. The Web camera can't be shared on a network.

A good example is Logitech's QuickCam Sphere, a camera with face tracking ability that can be stretched on a stand so it sits at eye level with its subject. It captures videos at 640 x 480 resolution and takes 1.3-megapixel photos. It connects to a PC via USB cable.



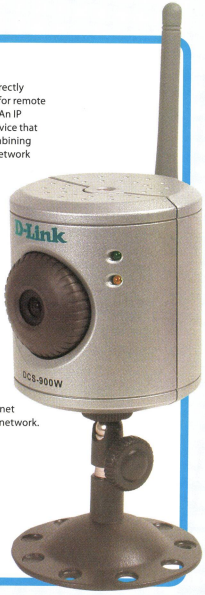

## IP camera

IP cameras are accessible directly from the Internet and used for remote monitoring or surveillance. An IP camera is a true network device that doesn't need a host PC, combining a camera, Web server and network interface into one unit.

With the inbuilt Web server, the camera serves images directly to the users on the Net who type its IP address or URL into a browser.

For an IP camera you'll need a fast broadband connection with a static IP address or Dynamic Domain Name Server (DNS) provider, as dialup isn't fast enough for streaming video.

The D-Link DCS-900W is an example of a wireless IP camera, which connects to the Internet via Fast Ethernet network or 802.11b wireless network.

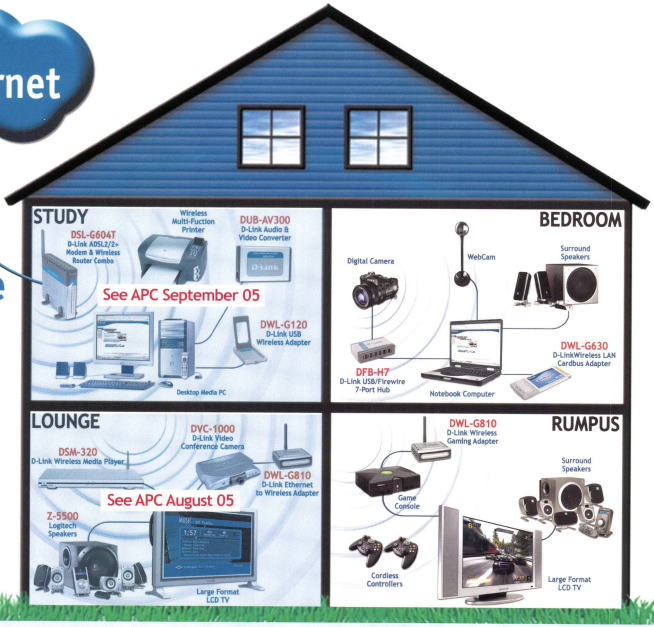



## D-Link & *APC* digital home competition

**D-Link is offering *APC* readers the chance to win a D-Link DFB-H7, a USB 2.0/FireWire Combo Hub as featured in the Bedroom (page 33). It's a combination six-port USB 2.0 and 1394 FireWire hub that brings together two popular, high-speed technologies for an all-in-one, high-speed, high performance solution for digital media peripherals. All you have to do is email *APC* at competition@apcmag.com and explain why it's handy to have one in the bedroom. Entries close midnight October 11, 2005. The most creative entry wins, and will be announced on November 16, 2005.**

dlink.com.au
Internet

# D-Link Digital Home Networking




This collector series on New Technology in the Digital Home is sponsored by D-Link Building Networks for People

October 2005

apc

# D-Link Digital Home Networking

## Wirelessly connect your bedroom to your digital home network, and start experiencing the benefits of the D-Link digital lifestyle.



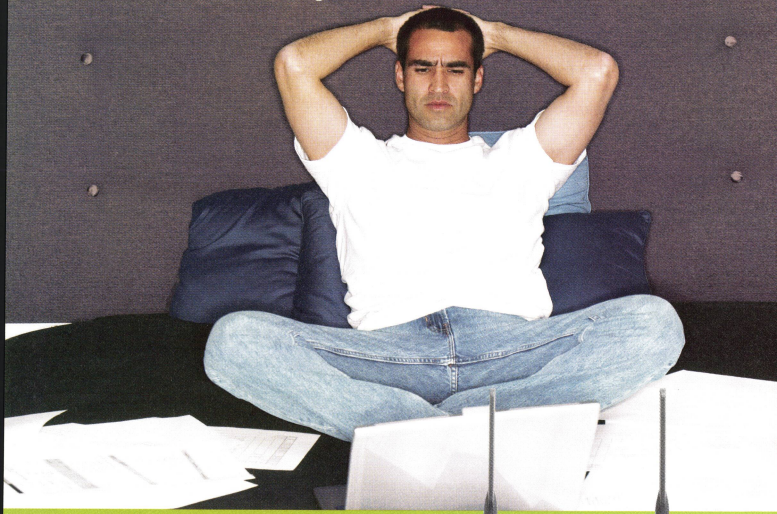

**DFB-H7**
**USB/Firewire 7-Port Hub**
The D-Link DFB-H7 is a combination 6-port USB 2.0 and 1394 FireWire hub that brings together two popular high-speed technologies for an all-in-one, high-speed, high performance solution for digital media peripherals.

Connect all of your digital media peripherals with the DFB-H7. With four USB 2.0 ports for connecting all of your USB peripherals and two FireWire ports, you have plenty of available ports to connect your digital video camcorder, hard drive, digital camera, Web cam or other FireWire and USB devices. The DFB-H7 is compliant with both USB 2.0 and FireWire standards, and a total of up to 189 devices (127 USB devices and 63 FireWire) can be daisy-chained.

**DWL-G630**
**Wireless LAN Cardbus Adapter**
The DWL-G630 is a wireless laptop adapter featuring the very latest in advanced wireless silicon chip technology including enhanced security to shield and protect your wireless communication from intruders.
The DWL-G630 also works with 802.11b standard wireless devices. Like all D-Link wireless adapters, the DWL-G630 can be used in Ad-Hoc mode to connect directly with other cards for peer-to-peer file sharing. In Infrastructure mode it can connect with a wireless access point or route for access to the Internet in your office or home network.

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# Disc rot nightmare

**One reader discovered that much of the data he'd backed up to DVD was unreadable.**

I purchased a spindle of reputable-brand blank DVD-Rs to back up the contents of my file server. After hours of copying and burning files using Nero under Windows XP Pro, I had used about 40 DVDs.

At a later date, I attempted to retrieve the data from the DVDs that I had burnt. But to my extreme disappointment, I found that about 15 of the 40 discs contained CRC errors.

In the following months, I tried burning files using two different DVD burners to a number of different brand blank DVDs. I still encountered CRC errors and was unable to diagnose the source of the problem due to the fact that it was intermittent.

Out of interest, I tried to retrieve the data from the 40 or so DVDs from the same machine but this time I tried running Fedora Core 3. I found that two discs out of the 40 contained CRC errors. However, I was able to retrieve all of the information from the other 13 discs, which wouldn't work under Windows.

At the moment I have two 320GB hard drives in my file server, which is running Gentoo. I have a scheduled cron job, which uses rsync to keep both the drives mirrored.



DVD burning isn't all it's cracked up to be.

From now on, I think I will continue to preserve my data in this fashion until the quality of blank media improves.

***Justin Cataldo***
***Kirwan, Qld***

## AUSTRALIAN MCE USERS UNITE

Having just completed the assembly of my own media centre (and learning a lot of lessons along the way), I think it's very important to talk to people and get your expectations set before diving in.

I was lucky enough to find a good outlet with staff who had already been through the process, but the folks at the Australian XP Media Center Community (**www.xpmediacentre.com.au**) Web site were an absolute godsend.

Their support and guidance (coupled with a wide understanding of what's available on the market) should be essential reading for anyone considering going down the path of a Microsoft-flavoured media centre experience.

In fact, anyone considering alternatives such as MythTV or MediaPortal or the limitations of a set-top box would do well to pay it a visit. Its biggest advantage is that, unlike sites such as the Green Button (**www.thegreenbutton.com**) or XPMCE (**www.xpmce.com**), it's Australian, so all the advice is useable.

Good luck to anyone embarking on an MCE adventure, especially the digital variety (it's well worth it if you have coverage, but you'll need a good antenna and wiring).

***Jeremy Cath***
***Gold Coast, Qld***

## letter of the month

### FINDING A RELIABLE MODEM

**In my previous letter to *APC*, "Pair gain no gain" (*APC* July, page 27), I detailed my ongoing struggle with pair gain in my area degrading dialup Internet speeds.**

**I have since purchased a selection of PCI modems from various leading manufacturers. The best connection was gained with a Conexant chipset-based model, which allowed access at 42Kbit/s. This sufficed at first, but a month later, the speeds dropped to 31Kbit/s.**

**Telstra's Internet Assistance Branch tested the line and advised that the local equipment had been given a "RAM8" upgrade and, being a rural location, the best transmission speed I could expect would be 42Kbit/s.**

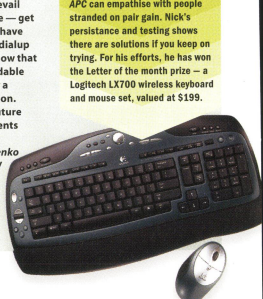
**Again I tested my recently purchased cache of modem cards. After several install/uninstall(s) and MTU setting changes, I finally received a stable connection rate of 52Kbit/s with a Lucent chipset-based Netcomm IN5699.**

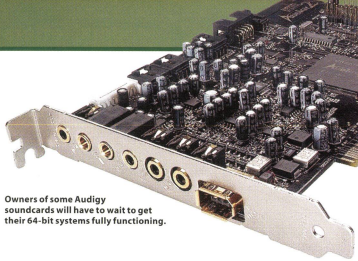
**For other readers in my situation, the network settings I used were MTU:576 TTL:128 NDI:64 RWin:5360.**

**This proves that persistence and trial will always prevail over the "build a bridge — get over it" attitude. I now have a perfectly acceptable dialup connection rate and know that the possibility of affordable broadband is currently a pipedream in my location. But who knows what future technology improvements will provide.**

***Nick Ivaschenko***
***Stratheden, NSW***

**Being Internet addicts ourselves, *APC* can empathise with people stranded on pair gain. Nick's persistance and testing shows there are solutions if you keep on trying. For his efforts, he has won the Letter of the month prize — a Logitech LX700 wireless keyboard and mouse set, valued at $199.**





**Owners of some Audigy soundcards will have to wait to get their 64-bit systems fully functioning.**

## 64-BIT DRIVER WOES

I'm a bit of a compulsive early adopter of technology, as I expect a lot of *APC* readers are. I recently bought a new system with a 64-bit Intel processor and decided to get the new x64 edition of Windows to go with it.

Obviously, I needed to get new drivers to work with the 64-bit code, so I downloaded new 64-bit drivers for my graphics card and some of my software utilities. I had no problems with any of them.

When I went to download new drivers for my common Audigy soundcard, I discovered that Creative hadn't yet released 64-bit drivers for its cards.

When graphics cards and every one of my software utilities have 64-bit updates, why is it that one of the world's largest hardware vendors hasn't got its act together?

It's not as if a 64-bit version of the world's most widely-used OS is a minor thing, and it hasn't come out of the blue either so there's no excuse for this lag on Creative's part.

An OS is no good to me without sound drivers, so until Creative delivers, I've had to put regular XP Professional back on my computer.

That one bottleneck will mean I'll have to wait a while before taking full advantage of my new system's capabilities.

***Steve O'Neil***
***Sydney, NSW***

**Creative advised *APC* that beta drivers are now available for Live!, Audigy and Audigy 2 (but not Live! 24-bit, Audigy LS, and Audigy 2 NX) at *http://preview.creativelabs.com*. Other drivers are due for release later in 2005.**

## SLIM DOWN XP

I thought I'd let everyone know about a great free tool called nLite (**www.nliteos.com**), which makes your installs of Windows XP fully customisable.

Microsoft has its own self-installer-maker, but nLite is much simpler to use. You can customise your install CD to do everything from a full unattended install to taking Windows components out, adding drivers (particularly useful for those who have a primary SATA drive, which often aren't supported by the Windows installer natively) and even slipstreaming in service packs.

***Darren Murphy***
***Manly, NSW***

**Also check out the slipstreaming Workshop on page 106.**

## TELSTRA'S TIME MACHINE

Tony Parsons wrote to *APC* (August, page 28) expressing his disbelief that Telstra scheduled his ADSL application for installation on November 11, 2011.

There are a few scenarios that may be playing out here, including no DSL ports being available at the exchange (or remote cabinet in some cases) or a DSL incompatibility on your telephone line (i.e., pair gain technology).

In such a case, Telstra will update your order with Network Build Investigation. This means Telstra is checking if more ports can be installed at the exchange or your phone line can be transposed (or in some cases provisioned if it's a new line.

If the above isn't possible, your order will be rejected. Otherwise the order will be updated to Network Build Underway along with an estimated date of completion. Hopefully you should then be able to enjoy your DSL service once provisioned.

***Boyd Chan***
***Wahroonga, NSW***

## DON'T BE RIPPED OFF

I was disappointed that *APC*'s accounting packages Labs Challenge (*APC* June, page 56) skipped over open source.

As a small business owner, I have tried a number of the more well-known software packages available on the market.

I have to admit that having a pretty GUI with lots of colourful icons isn't very high on my list of priorities. And after becoming frustrated with some of the more well-known packages (that make you keep paying even after you have bought the product), I switched over to an open source alternative.

Not only does this alternative do everything I want, but it has the capacity to support a huge array of business accounting requirements. SQL-Ledger (**www.sql-ledger.org**) is an OS-independent application written in Perl. It reads and writes to an SQL database, is accessed through Apache (or your choice of Web server) via a Web browser and allows for multiple users as well. Most importantly, it's free!

Support is available at a fraction of the cost that some of the more popular products charge. Through utilisation of HTML templates, invoices and statements are totally user-configurable.

I'm no computer genius, but I had the package up and running on a spare Linux PC in under 30 minutes, and that included installing PostgreSQL and Apache! The ability to configure remote access allows me to check costings, sales figures and inventory, print quotes and invoices and even email the reports from a Web

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**There are things about some Konika printers that users should know.**

**A DIY notebook may not always be cheaper than you expect.**

browser. I can do this no matter where I am, as long as I have access to an Internet-connected PC or PDA.

Configurability and scalability like this surely deserves to be highlighted, especially in an age where cost-cutting in business seems to extend to everywhere but the actual software that we use to achieve it!

I'm never again struggling with proprietary software that costs a lot to buy and maintain.

***Cameron Ellwood***
***Point Cook, Vic***

## MAKING NO BONES ABOUT IT

In a recent issue of *APC*, I came across an excellent-looking report on DIY laptops (*APC* June, page 98). However, after reading it, I discovered some startling facts.

To build your own notebook with the specs of 1.6GHz Pentium-M, 60GB hard drive, 512MB RAM and an optical drive, you'd be handing over no less than $2,600. And that's not even a state-of-the-art system. I was amazed that the barebones laptop shell itself cost $1,500. You can get a whole laptop for $1,500 let alone the barebones!

So for a start, why not just get a cheap laptop and take it apart and install better components? The second option is to buy a fully-configured laptop from a respected dealership with better stats than the DIY ones, which will apparently save a lot of money. I found much better deals in *APC*'s ad pages.

PowerNote offers a laptop with 1.8GHz Pentium, 80GB, 1GB of RAM, 256MB graphics, a Double Layer optical drive *and* Windows XP for $2,299. Compared to the DIY laptop this thing is a screamer. You could even play Far Cry and Doom 3 on it. I have no problem with the idea of the DIY notebook; it's just that it's not cheaper, doesn't have a better power-to-value ratio, and you don't get the whole system warranty coverage and support.

***David O'Connor***
***Red Hill, ACT***

## BRICKBATS AND BOUQUETS

I thought that *APC* was a little harsh on the Konica Minolta magicolor 2400W printer (*APC* July, page 59) where the major criticism was an allegedly dust-catching paper tray — a fault that I have never experienced!

I have the slightly earlier 2300W model, and I concur with your reviewer's finding that the colour quality is excellent, and I was pleased that the running costs were the cheapest on offer.

The Editor's Choice award was given to the Fuji Xerox DocuPrint C525A on the grounds of print speed and mono printing capability — the latter not being my highest consideration in a colour laser printer.

For me, running costs are more important than print speed. I produce a club magazine, and the ability to add a little colour on each page makes these laser printers attractive.

I was surprised that my Konica machine ran out of toner as quickly as it did, and checked with the manufacturer. It turns out that the cartridges show empty when a set number of pages have printed, even if colour has been used sparingly. It's possible to reset this in the options, but of course the check boxes are obscure.

I just wanted to draw this to your readers' attention, so they can check their own models.

Of even greater concern was Konika's admission that if one word on a page is in colour, then all the black on the page is printed from the three colour cartridges rather than the black. A saving in print speed but at great cost in toner. So now my magazine will only have colour on the photo pages.

***Rhys Howitt***
***Scullin, ACT***

## agenda

your place to vent

### DOES PIRACY REALLY COST?

**I purchased three genuine, original games in Thailand: Cold Fear, Splinter Cell: Chaos Theory and Brothers in Arms. Surrounding the shop that I bought them from were stalls selling pirated software for just a few dollars apiece.**

**I can guarantee mine are original games and play online. The price I paid for all these games in total was $51. At that price, most parents could afford to buy games for their kids.**

**All the boxes are marked "For sale in Thailand only" so I guess they are worried about people buying them in bulk and selling them in countries in which they rip off the consumer.**

**To me, this indicates that piracy provides viable "competition" to reduce pricing to more reasonable levels. Software costs at current levels are just an example of greed.**

***Paul Jones***
***Forrestfield, WA***

## Have your say

Add to these discussion threads or email your views (in fewer than 250 words) to **epinions@apcmag.com**. **All correspondence becomes the property of *APC* and is subject to editing.**

**Letters sent to *epinions@apcmag.com* must include the writer's full name, suburb, state and phone number to be considered for print publication and to be in the running for Letter of the month prizes. Phone details will not be published.**

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# SAVING LIVES THROUGH MOBILE COMPUTING TECHNOLOGY

## ASUS Notebooks Join NRMA CareFlight Helicopter Rescue Unit




"The ASUS M5 laptops have simply made our operation more efficient, mobile and professional," said John Hoad, CareFlight Chief Pilot.




NRMA CareFlight, an emergency medical and rescue helicopter unit, has been serving the people of New South Wales of Australia with highly trained medical professionals since its establishment in 1986.

"Every minute matters in the situations that involve CareFlight, said Mark Lees, Community Relations Manager of CareFlight. "The pilots need to map the shortest routes to the scene of the accidents and the doctors and paramedics must launch the helicopter in minutes to provide the injured the best medical assistance."

CareFlight is on stand-by 24 hours a day and must be ready to fly in just six minutes after assistance is requested by the NSW Ambulance, who are alerted to an accident through the 000 telephone emergency centre. This is where mobile computing comes in. The newest addition to CareFlight is ASUS notebook computers, which are implemented in different sectors of the emergency service, including aviation, medical treatment and administration.

"The ASUS M5 laptops have simply made our operation more efficient, mobile and professional," said John Hoad, CareFlight Chief Pilot. "They have allowed flexibility of information gathering, research, analysis and presentation that we have not had before."

CareFlight recently launched a new program that is aimed at improving survival rates in accidents with severe head traumas. CareFlight helicopter pilots, with the help of ASUS notebook computers, are now able to access the moving map system of UBD directories during flights to locate scenes of major accidents in the Sydney metropolitan and CBD, and land within 200m of the site. With the help of mobile computing, CareFlight can deliver a medical team on scene faster than a local ambulance, and this new program is expected to reduce deaths from head injuries by 33%.

"Our rescue missions ranges from urban areas to mountains and sea. A rugged and reliable laptop that can handle the bumps and grinds of helicopter rides is what we looked for," Hoad added.

Constricting helmets, tanned goggles and fireproof flight gear and gloves are all parts of the standard uniform of CareFlight pilots, who are also responsible for operating the ASUS notebooks on the helicopters. Therefore, the size of the display, brightness of the panel and the user-friendliness of the various input devices (keypad and touchpad) are factors that had to be taken under consideration also when selecting computer solutions.

"All our pilots have been very impressed with the ASUS M5 laptops and amazed at their ability to withstand the vibration of the aircraft," said Lees. "We are now ready to install ASUS M5 laptops in all our aircraft and to link them to the onboard navigation computers.

Since its inauguration more than two decades ago, Careflight has undertaken over 12,000 missions and saved countless lives. With the addition of ASUS notebook computers, CareFlight is equipped and ready to provide an even more complete service through the latest technology in mobile computing. RMA CareFlight, an emergency medical and rescue helicopter unit, has been serving the people of New South Wales of Australia with highly trained medical professionals since its establishment in 1986.

# Microsoft vs apple – the rematch

**As the battle between Microsoft and Apple intensifies, grown-ups worldwide stand to gain from looser child labour laws.**

Stuff competition for the sake of innovation and lower prices. A good fight is a good fight. So thank goodness Microsoft and Apple have resumed the death match we've been starved of for years.

Buoyed by recent strong financial growth, Jobs gave Gates the first touch up when Tiger was released. Some cracks that Tiger was already at least two generations ahead of the still-unreleased Windows Vista meant Gates had to fire back.

When Gates fires back, it's not with mealy-mouthed words. So when Microsoft's Virtual Earth was released and showed the Apple Cupertino campus razed (**http://tinyurl.com/9p4em**), it was seen as a similar gesture to getting the dead fish.

The animus goes way back to the dawn of the PC, when Gates proved to be smarter than Jobs by licensing an inferior OS. The prize for winning that contest was Richest Man in the World. Not a bad one to win.

Jobs won the Biggest Hissy-fitter, Tortured Genius, and Way Cooler Than Bill awards. But Gates keeps winning contests by waiting to see what Jobs does, then doing the exact opposite. It's proven to be a certain recipe for victory.

Example: Apple bloggers pimp products and generate hype for all company activity. Jobs sues them.

Gates on the other hand bribes them. Bloggers make Microsoft seem like a cutting edge, responsible corporate citizen. But if Channel 9 (**www.channel9.msdn.com**) and Scobelizer (**http://tinyurl.com/e2d2**) aren't sycophantic enough to make you want to vomit, then The Hive (**www.hive.net**) will surely have you evoking stabbing motions into your own eye.

In the lead up to the already-panned Windows Vista, Microsoft upped its support of bloggers. The company was already renowned for inviting bloggers to all manner of exclusive junkets. But The Hive is a masterstroke.

The Microsoft-sponsored site is designed to give "community leaders" of more than 50 people special access to Microsoft propaganda. Effused with a faux insiders' view, it means Microsoft's new puppets can break news and stir debate in the direction it was intended.

Like an embedded journalist unable to report on the troops that become companions, The Hive's bloggers get the best kind of indoctrination. By riding shotgun with the MS crew as things happen, they even start making the excuses for Microsoft's sub-standard products.

The Yank bloggers will shout-blog: "Hey, they tried their hardest, just deal with it, bud." Brit bloggers will moan-blog: "Stiff upper lip chaps. It could be worse." Aussies will whine-blog: "Aw yeah, that's just tall poppy syndrome, isn't it Alan?"

Gate's next recipe of victory also comes courtesy of doing the opposite to Jobs. Where Jobs has a sorta hippy humanitarian schtick, Gates has embraced child slavery with a community spirit that extends well beyond the blogosphere.

Being the richest man in the world means, if Gates wanted, he could own everything. In fact, if his government tries to sue him again, Dispatch hears that Gates plans to buy every army on the planet outright, and then threaten to destroy Capitol Hill with only New Zealand's defunct air force.

The thought of the world's meanest brute submitting to the equivalent of a mincing midget is too humiliating for Congress Republicans to contemplate. The Democrats are fine with it. Mincing midget rights, and all that.

So if Jobs thinks Gates will allow the possibility of punters switching to Mac minis so they can hook up their iPods, he should slap himself. Because Gates plans to get them young. All of them.

The rich guy recently visited 10-year-old Pakistani Arfa Karim Randhawa. Arfa is an MCP (Microsoft Certified Professional), and while it seemed to be the first conclusive proof that MS exams are technically simple enough for even a 10-year-old, Indian officials piped up about Mridul Seth, an eight-year-old MCP.

Arfa begged Gates for a job when he arrived at her home town of Faisalabad, but Gates was firm on "kids" staying in school. "But he said they do internships with high school kids," she told media. Naturally it's outrageous to be slaving at 10, but 12? No problem.

Arfa then pinned Gates about why there aren't enough women at Microsoft.

"He said it's hard to get women interested in technology," she said. "But it should be balanced with an equal amount of men and women."

Dispatch disagrees with Arfa's clear attempt at gender warfare. Like the Microsoft versus Apple war, parents everywhere know the world is Us versus Them. Grown-ups versus kids.

The workplace needs balance, indeed the economy needs balance. It should be balanced with an equal number of grown-ups and kids. The economy needs their input and to harness that boundless freaking energy often demonstrated just before bedtime. Because goodness knows, the rest of us are buggered and could do with a bit more playtime.

If you have an idea about how kids could take on a bit of the workload so you too can laze around the yard, play in the park or ride your bike off the lip of gutters till you're ready for a dinner that just magically appears on the table, send it to gmontgomery@apcmagazines.com.au. The best entries will be published at apcmag.com and in the November issue of *APC*.



> **GATES HAS EMBRACED CHILD SLAVERY WITH A COMMUNITY SPIRIT THAT EXTENDS WELL BEYOND THE BLOGOSPHERE**
>
> **Garth Montgomery**

# apc.labs

REAL WORLD TESTING

Detailed product reviews and comparisons

JOHN GILLOOLY



Benchmarking is a business *APC* Labs takes very seriously. Testing products involves a large amount of repetition and a huge amount of time. This means *APC*'s three Lab testers have to spend a lot of time together, immersed in the world of products.

Products that arrive in the Labs are discussed, poked and prodded by all of us at some point during the review process. When we started planning the testing of AMD and Intel CPUs for this month's "AMD versus Intel" feature (page 72), we wanted to highlight the thermal performance of modern CPUs. When the idea of cooking eggs on the processor was suggested in an editorial meeting, it was met with an equal amount of scepticism and encouragement, enough for us Lab Monkeys to commit to making the dream of a Pentium-driven breakfast a reality.

It was a set up MacGyver would have been proud of. Some heatsinks, tools, aluminium sheeting, super glue and thermal epoxy resin. Over the course of an afternoon, Nick Race carefully removed every fin from the heatsink, filed the base smooth and then mounted an aluminium tray he'd made onto the base with thermal epoxy. When time came to get cooking it worked wonderfully, stunning those who stood around watching the raw egg turn to tasty breakfast sandwich ingredient in next to no time.

While Nick was exploring this convergence between IT and cookery, Dan Chiappini was deeply immersed in projector testing (page 62). Through the course of 12 projectors, Dan had the pleasure of sitting in the dark, rewatching scenes from three movies over and over. While it means that Dan can now detect the smallest of subpixel differences in image quality between projectors, I ended up seeing certain scenes way too many times to be healthy for my sanity. And I was ensconced at the other end of the labs, testing gaming PCs.

It has been a quiet month for new products as the ramp up to Christmas begins. However, we have been captivated by some great products. Sun's Opteron-based Ultra 20 Workstation (page 40) scored points for its sheer industrial retro look.

Sony's consumer HD camera (page 43) is a product that had to happen. These past six months or so have shown that consumer electronics and IT companies are determined to drag us into the HD era as soon as possible, and its great to see a content creation option emerge that isn't priced out of consumer reach.

A lot of HD-capable displays and other hardware are flowing into the Labs, and I like what I see. Now that WMV9 acceleration is being enabled for supported graphics cards in Windows, it's only a matter of time before it's joined by H.264 to make PC playback of true HD video a reality.

All in all, it's been a damn exciting month in the *APC* Labs.

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# Sun Ultra 20 Workstation

**Sun's new range of Opteron workstations won't give you a nasty burn.**

● **CONTACT** Sun Microsystems ● **PHONE** 1800 628 193 ● **ONLINE** www.sun.com.au ● **PRICE** Small, $1,190; Medium, $1,855; Large, $3,590

● **INTENDED MARKET** Business ● **PROS** Excellent performance; plenty of power ● **CONS** Limited storage expansion options ● **VERDICT** 4/5

For the first time, Sun is offering a range of hardware that isn't based on its proprietary SPARC CPU, and isn't tied to Solaris. Sun initially launched two Opteron-based servers — the Sun Fire V20z (see *APC* September, page 62) and V40z — capable of running its recent port of the Solaris operating system to the AMD64.

A new range of workstations, dubbed the Ultra 20, has since been released. Pairing an Opteron processor plugged into the PCI Express-capable NVIDIA nForce4 Ultra chipset, the key design decisions focus on flexibility and power. The workstations are primarily targeted at software developers, electronic design, CAD, automotive, aerospace and multimedia artists.

The machines are bundled with: Sun Studio 10 for C++; Cobol and Fortran development; Sun Java Studio Enterprise, based on NetBeans cross-platform technology; and the new Java Studio Creator, a visual, rapid development environment for Java. Sun Studio 10 can also be run on SUSE Linux Enterprise Server or Red Hat Enterprise Server if Solaris isn't your game, while Sun Java Studio Enterprise and Java Studio Creator support Windows.

The Ultra 20 is available in three "sizes". The $1,190 Small size features an Opteron 144 at 1.8GHz, 512MB of standard PC3200 memory, onboard ATI RAGE XL graphics and a 7,200rpm 80GB SATA hard disk drive. The $1,855 Medium model ships standard with an Opteron 148 at 2.2GHz, 1GB of ECC PC3200 memory, a 7,200rpm 80GB hard disk drive and an NVIDIA Quadro NVS280 graphics adaptor.

*APC* tested the $3,590 Large build, driven by an Opteron 152 processor at 2.6GHz, 2GB of ECC PC3200 memory from Micron, a single Seagate 7,200rpm 250GB SATA drive and an NVIDIA Quadro FX1400. The machine is also fitted with a Matshita/Panasonic SW-9585 DVD-RAM 5x drive capable of 16x DVD±R and 4x DVD+R Double Layer and CD support. The nForce4 Ultra chipset supports a Gigabit Ethernet port and four rear USB 2.0 ports. All three models can be upgraded to the recently announced dual-core Opteron CPUs. As of press time, Sun was still in the process of validating the new CPU models.




**A reasonably priced workstation capable of fulfilling several roles.**

*APC* was pleasantly surprised to find the Solaris 10 operating system preinstalled with the necessary drivers. A Sun representative confirmed that all machines are shipped with the OS, though you're not locked into using it if you prefer a different platform. The *APC* Labs workstation benchmarks are all Windows based, so after a brief foray into the Unix world, the machine was formatted and Windows XP Professional was installed for testing purposes.

For reference, the Ultra 20 was benchmarked with Business Winstone 2004, earning itself a very respectable 29.6. Following up with Multimedia Content Creation Winstone, the Ultra 20 managed an extremely impressive score of 40, making it one of the few systems to date that have scored over 39. Cinebench clocked the machine at 369 for image rendering, while SPECViewperf 8.01 scored the Ultra 20's 3ds Max capabilities at 30.02. Maya rated at 52.02 and LightWave at a very respectable 28.65.

The machine suffered a little under synthetic PCMark benchmarks. Lower scores were given because of its productivity, rather than game-oriented, graphics adaptor. Scores of 5,211 in PCMark04 and 3,805 in PCMark05 don't take the raw speed of the system into account. A 3DMark05 score was taken for consistency and, as expected, the lower-end Quadro card didn't perform well under this game-oriented benchmark with a score of 3,111.

The internal design of the workstation is also extremely impressive. The retro-styled utilitarian exterior hides a well-designed interior, including a server-styled, hot-pluggable SATA backplane with drive rails. Unfortunately, the drive bay only holds two hard disk drives, and there's no room for extra optical drives, floppies or other additions. The exterior presents two forward USB 2.0 ports and two FireWire ports below the single optical drive bay. All three models include a three-year, next business day, onsite warranty.

This is a reasonably priced workstation capable of fulfilling a variety of roles. The workstation's performance was very good for the tasks suited to this type of system, though other scores show it would be wasted if put to use as a general-purpose productivity or gaming machine. Physically, the system is solidly built, though the lack of storage expansion options is worrying for a machine intended to last several years.

***Nick Race***

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- Windows XP Home/Professional, Linspire

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- Windows XP Home/Professional, Linspire

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- 802.11b/g Wireless
- 2 Speakers, Firewire
- Windows XP Home/Professional, Linspire

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Ultimate road warrior featuring new Intel 915 Sonoma chipset



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†APC Survey Nov ember 2003

# Microsoft Windows Mobile 5.0

## Microsoft Windows Mobile 5 hits the spot for handheld users.

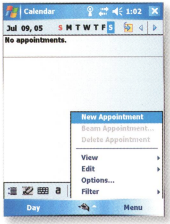
● CONTACT **Microsoft** ● PHONE **13 20 58** ● ONLINE **www.microsoft.com.au** ● PRICE **TBA** ● INTENDED MARKET **Everyone**

● PROS **Persistent storage; GPS integration; improved GUI** ● CONS **Not for all devices; missing Wi-Fi sync** ● VERDICT **4/5**

The latest Microsoft operating system for Pocket PC and Smartphone platforms adds to an already solid base.

Windows CE 5.1 is the existing foundation used across all of the different handhelds that are designated as "Windows Mobile Powered", which means applications developed for one device class should be able to run on others with minimal tweaking.

The user interface is now into a refinement cycle of development rather than one of radical changes. The handheld and Smartphone GUIs are quite similar with the introduction of context-sensitive soft buttons at the bottom of the Pocket PC screen. When you're on the Today screen, the buttons provide access to your calendar and contact list. In other instances, they're used for choosing the different input panels or accessing menus.




**New context menus at the bottom of all screens put the most common commands just a tap or two away.**




**The browsing experience has been greatly enhanced with a larger viewable area and improved security.**

### PERSISTENCE PAYS

Persistent storage was put on the PDA radar by Palm last year. The Windows Mobile 5.0 platform now supports this natively, which means that if your device is totally discharged, its data will remain safe.

The operating system and data are stored in the ROM together with all of the application and system settings. If you've been using a device with a large non-volatile file store, then you'll be familiar with this. RAM, on the other hand, is used for program execution.

### CONNECTIVITY HIGH

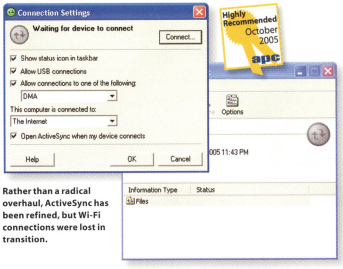
Wireless communications in just about every flavour imaginable are fully integrated into the OS. Smartphones now have built-in support for Wi-Fi, which means you can have a single device with both Wi-Fi and 3G connectivity. While that's been possible with current Phone Edition devices like the 02 XDA IIs, it hasn't been done with phone-sized hardware.

A growing number of PDAs are hitting the shelves with integrated GPS, and literally hundreds of different adaptors are available. Slipping into Settings reveals a new GPS applet. This means that the interface between the GPS hardware and the OS will be tighter, leading to greater stability and increased scope for developers to integrate GPS into applications through standardised APIs.

### SUITE SPOT

Pocket Word and Pocket Excel have been replaced with Word Mobile and Excel Mobile. The mobile office applications natively support the same file formats as their desktop brethren, adding support for graphics as well as an increased range of formatting options. There's also the long-awaited addition of PowerPoint Mobile. Although it doesn't support editing of presentations, you can now view the slideshows from their emails.

As well as displaying images and movies, Pictures and Videos integrate with the Contact list, making it easier for you to assign an image to a contact. Images can also be played as a slideshow that can be set as a screensaver.




**Rather than a radical overhaul, ActiveSync has been refined, but Wi-Fi connections were lost in transition.**

### ONLINE ADDITIONS

An updated version of MSN Messenger is integrated into the Today screen, together with a mobile version of the MSN browser.

Pocket IE supports secure connections and the interface has been cleaned up so that more screen area is available for viewing the pages. Forward and back commands let you flick between pages without needing to remember every link you've clicked.

Integration with email has been added with a command for emailing links. The old messaging program is now dubbed Outlook Email and it supports Hotmail accounts as well as POP3.

### DESKTOP CONNECTIVITY

ActiveSync has finally moved to Version 4. At first glance, it doesn't seem all that different but there are some under-the-covers changes. Significantly, the ability to sync over Wi-Fi has been removed. This is a substantial omission, as it means that the only way to sync over a network is to an Exchange Server.

There are also minor changes to some dialogs, but otherwise, it looks quite similar to recent versions.

### UPGRADING

While many consumers expect the OS can be upgraded, it's up to the device manufacturers to release relevant updates.

Both Dell and HP have announced that some of their current devices will be upgradeable — Dell will be offering upgrades for the X50 line while HP will do the same for the hx4700 and hx2000 series.

Of course, these upgrades aren't free — in the past they cost around $50. While the upgrades don't cover every device Dell and HP are selling, you could be able to add a few more years to your device's life cycle.

***Anthony Caruana***




Accessible controls for a more comfortable recording experience.

The clear and crisp CMOS imaging system puts it on par with CCD cameras.

Loaded with new features similar to professional film equipment.

# Sony HDRHC1

Editor's Choice October 2005 apc

## Sony's HD camcorder brings beautiful 1080i video to the masses.

● **CONTACT** Sony ● **PHONE** 1300 137 669 ● **ONLINE** www.sony.com.au ● **PRICE** $3,499

● **INTENDED MARKET** Enthusiasts/prosumers ● **PROS** 1080i HD; excellent features ● **CONS** Poor access to white balance ● **VERDICT** 4.5/5

After almost two years, high-definition video has finally dropped down from a six- to four-figure price range. But the Sony HDRHC1 puts 1080i high-definition video at a consumer price point — an impressive $3,499 — well before HD screens have made it down to a similar affordable range.

The camera features a 3-megapixel CMOS sensor, recording HDV1080i in 16:9 aspect ratio or standard DV in either 16:9 or 4:3. Any video recorded in HDV will be automatically down-sampled for viewing on SD equipment. Output can be sent to the computer using FireWire or USB 2.0, or out to a TV via component or composite video.

CMOS is rarely used in video devices, but Sony has been pushing it in the market with the recent release of its 3-CMOS camera. With its Enhanced Image Processor developed specifically for CMOS, Sony has eliminated some of the older concerns of CMOS systems. The clear imaging system shows no indication that this is a lesser system than CCD cameras. The 10x optical zoom combined with a Carl Zeiss lens gives great image clarity at maximum optical zoom.

Sitting comfortably in the hand, all mounted buttons and controls are easily accessible during recording. The onboard stereo microphone offers good quality performance, plus the Active Interface Shoe mount can take a specialist mic or an onboard light source.

One of the big advantages of the high-definition resolution is that you can finally get some good use out of the focus in a digital video camera. With the HDRHC1, you can play with the depth of field in different artistic ways; for example, images in the foreground can be crisp against a subtly blurred background and vice versa. This is a major boost for anyone keen to shoot with some cinematic flair.

Sadly, there's no one-button access to white balance and the auto system doesn't do very well indoors. The backlight button offers only a very slight improvement, so you'll have to check the menu-based aperture settings to get a good image against bright backgrounds. That said, a lot of power is packed within the menus. The camera's touchscreen LCD display makes navigation a breeze, and the menus are clearly laid out for quick access to the functions you need.

Two of the most powerful features in the menu are spot focus and spot metering. These offer some intelligent on-the-fly image management options. Spot focus allows you to use the touchscreen to pull a particular point onscreen into focus at a steady rate.

Spot metering is what the backlight button should be, and again you have to use the touchscreen to select the point on the screen to be targeted as the normalised lighting point. This is an excellent feature to have ready on the LCD when you're shooting in rapidly changing bright conditions.

Another top-class feature is the shot transition menu option. This is great for setting up scenes when shooting a short film or looking for the smoothest possible shot management. You can store two separate combinations of focal length and zoom distance, then execute an automatic transition to either preference. These features are the kind of thing you would expect to find in serious film equipment, so it's very valuable to find them in the HDRHC1.

To keep things simple, the camera records HDV footage to standard miniDV tape, using the same MPEG-4 encoding used for HDTV broadcasting. You can also insert a Memory Stick Duo for capturing still images. The camera includes a 16MB Memory Stick Duo, as well as a Memory Stick adaptor so it can be read with a standard Memory Stick reader.

With the clarity offering real depth of field options and the many additional features available for producing highly polished camera work, this camera will serve anyone well for years to come. Its ability to record at 1080i means you'll be shooting images on par with the best CCD cameras for a long time.

***Seamus Byrne***

# Western Digital Passport 80GB

**A rugged external drive unit that stops short of being great.**

● CONTACT **Westan** ● PHONE **(02) 9648 2060** ● ONLINE **www.westerndigital.com** ● PRICE **40GB, $229; 80GB, $279**

● INTENDED MARKET **Everyone** ● PROS **Good transfer rate** ● CONS **All-round rubber would protect it better** ● VERDICT **3.5/5**

Protecting your digital lifestyle takes more than passwords. Western Digital's Passport-branded external hard disk drive will take a pounding so you can safely go off-road.

The WD Passport is a rugged USB 2.0 external hard disk drive enclosure, packed with a 40 or 80GB hard disk drive from its 2.5in Scorpio range. The enclosure itself includes a USB 2.0 connector, an external power connector plus the necessary electronics to convert the USB 2.0 interface to the ATA commands the drive understands.

It's USB bus powered, meaning no external power supply is needed for most PCs and notebooks. WD included a power connector for those running notebooks with low-power USB ports. The power adaptor is available separately for $19.95.



**Although aesthetically pleasing, the WD Passport is susceptible to damage.**

The drive runs at a 5,400rpm spindle speed with an average seek time of 12ms. It uses 2MB of cache to supply the bus — no record-breaker but a step up from low-cost 4,200rpm drives. It's non-user-upgradeable and has a formatted capacity of 74.5GB.

The enclosure measures 2.1 x 14.4 x 8.9cm (HWD), with rounded corners and tough rubber backing. The top side is tough ABS plastic. The rubber backing covers three of the four corners, which leaves one corner more susceptible to damage.

While not the lightest drive at 240g, it's reasonable for its capacity. The hard disk is rated for up to 250G of shock when operating and 900Gs when off, translating to a drop from a tabletop. The drive includes WD's DuraStep Ramp technology to park the head off the platters when not in use, reducing the likelihood of a damaged platter if dropped.

The WD Passport 80GB drive was tested in *APC* Labs with the HD Tach benchmarking application under Windows XP SP2, connected to a motherboard USB 2.0 port. Formatted with NTFS, the drive managed a read speed of 24.5MB/s, and 22.4MB/s with FAT32. It's what is expected from an external drive unit, lagging behind desktop internal disk drives.

Additional features like backup software or password protection would have been nice. But only one thing stops the WD Passport drive from being a great product: the lack of rubberised casing around all of the corners.

***Nick Race***

# Vosonic X-Drive II VP3320

**An MP3 player limited only by the amount of the hard drive you can afford.**

● CONTACT **PC Case Gear** ● PHONE **(03) 9584 7266** ● ONLINE **www.pccasegear.com.au** ● PRICE **From $195 (no HDD)**

● INTENDED MARKET **Everyone** ● PROS **Great functionality and features** ● CONS **Battery life could be better** ● VERDICT **4/5**

MP3 players are just about as popular as mobile phones and come in almost as many varieties. While the iPod may have cornered the trendy market, where does that leave power users who want something a bit more scalable and flexible? Enter Vosonic's VP3320.

At 12 x 8 x 2.8cm (HWD) and just over 270g, it's bulkier than most dedicated MP3 players. But this is because it uses a standard 9.5mm 2.5in hard drive, similar to the type used in most notebooks.

The advantage is that the storage capacity is only limited by the size of the biggest hard drive you can afford. It will access drives of any size, so to upgrade, just get a bigger drive. This is also a huge cost saving over standard MP3 players.

The unit only reads FAT/FAT32 partitions, but Vosonic provides a utility to enable Windows-based machines to format drives over 32GB in size as FAT. There's also a utility in the unit's OS that will do the same, and it's easier and faster.

The major benefit is the large feature set. It has two memory card readers (SD/MMC/MS/MS Pro/CF/MicroDrive/MiniSD/RS-MMC/MS Duo/MS Duo Pro) and they are also accessible as removable storage devices in Windows when connected via USB.

FM tuning and FM signal recording is incorporated, and it features a line-in jack for voice recording and an internal mic.

The VP3320 supports MP3 from 32 - 320Kbit/s CBR/VBR and WMA 32 - 320Kbit/s CBR/VBR. There's a user-definable equalizer, and ID3 tags are supported.

Battery life is good — seven hours of constant use with the Fujifilm NP60 Li-Ion battery and 11 hours with the optional NP120. It can be recharged with a 5V 2.5A DC adaptor or from the USB port. When acting as an external hard drive, it must be powered from the mains. Also, it can't be used while recharging from the USB port.

Functionality is constantly being improved by Vosonic, which releases regular firmware updates for the OS. Get past its clunkiness and the VP3320 does everything a mobile power user will ever need.

***James Bannan***




**Clunky but functional: the major benefits of Vosonic's VP3320 lie in its large feature set.**

# Diamond Digital

**As if the super slim design, high specifications and great value price weren't enough to raise your eyebrows.**



Style and flexibility just became affordable, with the new Diamond Digital DV177 and DV197 monitors from Mitsubishi Electric Australia. The flexible, height adjustable stand will always ensure you get the best ergonomic position whilst you work, and the slim lines and narrow bezel make it stylish without cluttering your workspace. Add to this their 1280 x 1024 resolutions, high brightness and contrast, low response times, dual VGA and DVI-D connectors, and three year limited onsite warranty, the DV177 and DV197 will take your computing experience to new heights. Available in Beige and Silver/Black.




mea0307k/qc

**MITSUBISHI ELECTRIC AUSTRALIA**

**Mitsubishi Electric Australia Pty. Ltd.** 348 Victoria Rd, Rydalmere NSW 2116 Ph: (02) 9684 7777 Fax: (02) 9684 7208 **www.MitsubishiElectric.com.au**

# Fedora Core 4

**Fedora Core's notable improvements may just keep it at the cutting edge of Linux distros.**

● **CONTACT** (02) 8923 2800 ● **ONLINE** www.apac.redhat.com ● **PRICE** Free (available under GPL) ● **INTENDED MARKET** Everyone

● **PROS** Cutting-edge open source technologies ● **CONS** Some installation instabilities; updates not particularly effective ● **VERDICT** 4.5/5

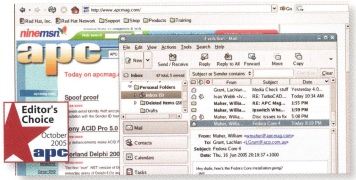
Based on a 2.6.11 Linux kernel, Fedora Core 4 (FC4) ships with GNOME 2.10, KDE 3.4, Firefox 1.0.4 and OpenOffice 2 Beta (1.9.104). It also includes SELinux (NSA's security-enhanced Linux) and Logical Volume Management to facilitate Fedora-based server clusters using common storage pools. It's also the first version of FC compatible with IBM's PowerPC and PowerPC64 architecture.

The Anaconda installer is one of the best around. Unfortunately, during testing a number of problems occurred before the Anaconda stage was reached. The downloaded DVD ISO refused to load on a few hardware platforms and the CD ISOs bombed out several times across different hardware platforms, even after downloading the ISOs from an alternate distribution server.

Menu rendering, application launching and file browsing are faster in GNOME and KDE. The kernel is designed to make use of high-end hardware, but those users running FC4 on lower-end machines will benefit also.

The best addition to this package is OpenOffice 2.0 Beta. It ships with Base, the open-source equivalent of Microsoft Access, with support for internal HSQL databases or external Access and MySQL databases (via ODBC and JDBC drivers).

Compatibility with existing Office applications has also improved — you can open these documents straight in OpenOffice, and retain the same file format.




**Fedora fever: the latest iteration has its installation issues but will ultimately appeal to both novice users and Linux gurus.**

The memory footprint is quite large — on an Intel 845-based laptop with 512MB RAM, a KDE session with a few OpenOffice apps open swallowed up 400MB of physical RAM.

The main downside to FC4 is the update service. Up2date still relies on the command-driven yum utility, which tends to report "no updates available" even when there are.

***James Bannan***

Beatty POW2807

Now there's no excuse for unsafe computing

The new black range from Eaton Powerware

Triple Power Warranty

Whenever you use mains power you risk surges, blackouts, damage to your computer and data. All professional installations use a UPS. Well now you can afford one for your computer as well. The new Powerware 3105 gives you three outlets of battery backup and three more outlets of surge suppression. This small, unobtrusive black unit even has protection for your telephone line, fax, printer or scanner. The LanSafe software performs unattended shutdowns whilst keeping you informed of power problems and low battery conditions. This inexpensive unit has all the cables and software you need for complete protection, so why take the risk?

Triple Power Warranty with load protection lets you rest easy with protection for all your equipment.

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# WatchGuard Firebox X Peak X8000

## A firewall appliance designed to take a lot of the hassle out of enterprise-level network security.

**CONTACT** WatchGuard Technologies **PHONE** (02) 8912 2199 **ONLINE** www.watchguard.com **PRICE** $14,500 **INTENDED MARKET** Enterprise

**PROS** Constantly updated protection profiles for security threats and antivirus **CONS** Some subscription-based support elements

Security is becoming increasingly important to organisations at all levels. WatchGuard's new range of firewall appliances seek to take a large portion of the daily management of a network's security out of the hands of the network staff.

The range of products includes: the Firebox X Peak enterprise-level high-throughput firewalls, starting at $8,500; Firebox X Core for less demanding or complex networks, beginning at $2,825; and Firebox X Edge for small business and telecommuters from $675.

The X8000 can support up to three Gigabit LAN connections for protecting larger networks or multiple network segments, and has the ability to interact and failover with other Peak models. The Peak product includes support for multiple firewalls — all centrally managed using WatchGuard's Management server — and devices can automatically create VPN connections between each other to share logs, configuration and management.

Configuration and management is performed through WatchGuard's System Manager software, which enables quick, secure updates of the firewall configuration, as well as comprehensive monitoring of user activity, unsolicited connection attempts and VPN tunnels. The software can show user connections visually for easy monitoring of users' access.

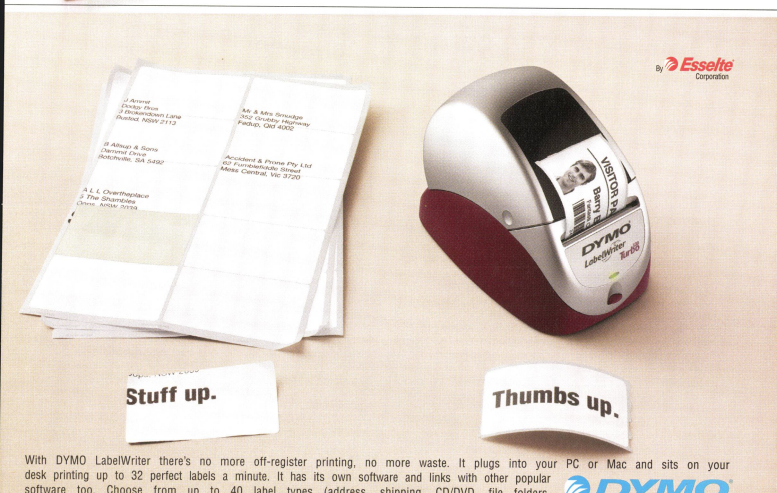



Included with the purchase of the Peak product is access to WatchGuard's LiveSecurity service. New security threats are monitored and evaluated within a short time of coming to light, and fixes, workarounds or patches can be automatically applied to the devices' software. Similarly, the firewall's network antivirus scanning is updated for new threats as they are discovered.

WatchGuard's products can be upgraded incrementally within a product model. Businesses that purchase an X6000 can later upgrade to an X8000 with more functionality through software, maintaining a hardware platform and reducing downtime.

The Firebox range of products from WatchGuard offers an excellent solution for the increasingly complex task of protecting large networks.

**Nick Race**

# O2 XDA IIi

## O2 adds a high performance and totally connected device to its PDA phone range.

● **CONTACT** Brightpoint Australia ● **PHONE** 1300 300 213 ● **ONLINE** www.seeo2.com ● **PRICE** $1,599

● **INTENDED MARKET** Everyone ● **PROS** All wireless; good performance ● **CONS** Poor text entry ● **VERDICT** 4/5




The O2 XDA IIi is one of the best-connected PDAs with Bluetooth, Wi-Fi and tri-band GSM/GPRS. The processor has had a big boost over its predecessor, the XDA II.

The 400MHz unit has been replaced with a 520MHz unit that delivered a Spb Benchmark score of 1,214 — about mid-range for a Pocket PC. Under testing the XDA IIi was responsive, with the ability to scroll quickly through a list of over 400 contacts and easily switch between open applications.

There's plenty of storage, with 128MB of system memory and an additional 60MB of non-volatile memory. Storage can be boosted through the SDIO/MMC slot that can also be used for I/O devices, such as barcode scanners and GPS receivers. The XDA IIi includes a camera, and rather than the usual VGA unit most devices ship with, it runs with a 1.2-megapixel unit that can take decent snaps in JPEG format and video at a maximum resolution of 240 x 320 in MPEG-4 or Motion-LPEG AVI formats. All of this is easily viewable through the 240 x 320 transflective display.

The XDA IIi can be carried in a shirt pocket as it's just 6.9 x 13 x 1.9cm (WHD) and 190g. Bluetooth lets you use a wireless hands-free or car kit. It ships with a wired hands-free as well as cradle and software CD. Connectivity to Windows PCs and synchronisation to Outlook are provided out-of-the-box. Other PIMs or operating systems require the purchase of third-party software.

The Lithium-ion battery is rated at 1300mAh. A looped MP3 played for five hours and 40 minutes, with the mobile phone radio enabled and the screen kept on at 50% brightness, suggests at least a couple of day's use between trips to the charger.

As well as the standard Pocket Office and Outlook applications common to all Pocket PCs running Windows Mobile 2003 SE, the XDA IIi adds the ClearVue PowerPoint and PDF viewers from WesTek. It has also licensed Spb's GPRS monitor for tracking comms costs. It lets you set alarms when your usage hits specific thresholds to help control GPRS bills.

Although the O2 XDA IIi is an evolutionary step up from the XDA II, it does a good job of integrating a robust PDA with a mobile phone. The additional software makes it a useful adjunct to the mobile professional's toolkit.

***Anthony Caruana***

# Aventail EX-750 SSL VPN appliance

## VPN without the client configuration? Aventail has the solution.

● **CONTACT** Aventail ● **PHONE** (03) 9225 5262 ● **ONLINE** www.aventail.com ● **PRICE** 25 users, $14,500; 50 users, $20,800

● **INTENDED MARKET** Business ● **PROS** Ease of administration; excellent security features ● **CONS** No secure desktop support for Mac or Linux ● **VERDICT** 4/5

Aventail's EX-750 appliance provides VPN service via SSL (Secure Sockets Layer). After clients point a Web browser at the device's hostname or IP address, the EX-750 then handles the login via an internal LDAP, Active Directory, RADIUS or local-user list. The device allows the client either Web access, thin client access to Web enabled applications or full-blown TCP VPN support.

The device's End Point Control (EPC) feature can be set to interrogate a connecting client's PC environment for various predetermined conditions. Once the security situation is established, appropriate level access to the network is provided.

Using Aventail's On-Demand technology, a Java-based applet, TCP support is enabled for thin client-type access to allowed network resources. If On-Demand isn't permitted to run due to the client's security level or support, then Web access is allowed to the intranet or Web-enabled applications. There's also an executable access client called Connect that can run full-time, like a traditional IPSEC VPN solution, that also allows UDP and TCP connectivity. For unknown environments, or extremely secure connections, Secure Desktop can be downloaded and run via ActiveX or Java, which keeps all work encrypted and separate from the client machine.

The flexibility that can be achieved with the device's software is very impressive.




Creating rule sets based on a mixture of client end point control and internal group membership for access to specific resources is surprisingly straightforward. The EX-750 supports up to 50 concurrent users, while the EX-1500 includes high availability and scalability. The unit's Web and thin client using On-Demand works with Windows, Mac and Linux clients, while Secure Desktop container only works with Windows.

The unit is refreshingly easy to install and manage. Active Directory integration was seamless and it was easy to create a comprehensive security policy for different user groups in a few hours. For businesses with external workers and travelling executives, the ease of use and flexibility of the solution would be a godsend.

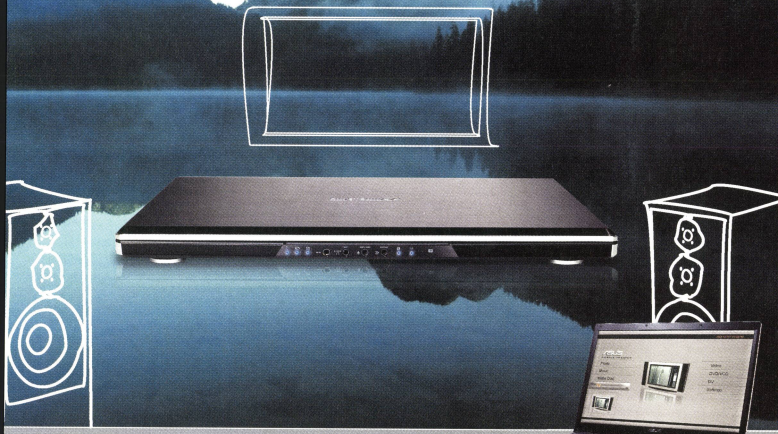
***Nick Race***

ASUS recommends Windows® XP Professional

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# Norton Internet Security 2005 AntiSpyware Edition

**This all-in-one protection from Net nasties may not be the cure-all users need.**

● CONTACT **Symantec** ● PHONE **1800 680 026** ● ONLINE **www.symantec.com.au** ● PRICE **Download $136.30; boxed version $149.95** ● INTENDED MARKET **All**

● PROS **All-in-one solution; pre-install virus scan** ● CONS **Memory hungry; won't remove piggybacked ad/spyware; can confuse beginners** ● VERDICT **3/5**

Norton Internet Security 2005 AntiSpyware Edition (NIS 2005) contains the stalwarts of the Norton brand with promise of protection from spyware and adware.

*APC* Labs installed NIS 2005 and was impressed when the first act of the installation routine was to scan for virus activity, putting an end to known viruses that block installation of common antivirus applications. It also prompted to disable Windows Firewall, a good suggestion considering the suite includes a more functional firewall. However, details of how to disable the Windows Firewall weren't included.

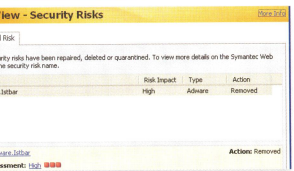
Configuration of the complex suite took around 20 minutes. While some options were obvious, there were moments that could confuse the less computer-literate users.

And once installation was complete and updates downloaded from Symantec, the test system became sluggish. Quick inspection showed the various tasks consuming 37MB of system RAM on average — not ideal for a PC running 24/7.

*APC* pointed the test system towards some dubious Web sites and within a short time, NIS 2005 identified and successfully blocked a number of adware/spyware installation attempts. A "free" screensaver known to contain spyware was then downloaded and installed. The suite identified but did not offer to remove it. Unfortunately, the package default was set to "ignore" as it had piggybacked in with another application.

NIS 2005 is also apparently ignorant of the Firefox browser. For a safer Web experience, Firefox is the browser of choice, though even the Trusted Application List-driven firewall requires manual approval of this "medium risk" application.

NIS 2005 isn't perfect. System resource issues, puzzling installation choices and an overly tentative approach to adware removal could leave some users dissatisfied. However, it's the only product close to offering a comprehensive Internet security solution.




**NIS 2005: under testing it successfully identified and blocked a number of adware and spyware apps from installing.**


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# Hit the shops

## Entertainment is the name of the game for this month's best buys.

The winner of this month's gaming PC Labs Challenge was Emagen's Vitesse SLI, a system that's perfect for hunting down some R&R with a lower price tag to boot. Earning the Best Value title was the PC Quest Signature. It has a top-of-the-line dual-core processor and dual-video card setup that ensures extremely smooth gaming.

Combine either of the gaming PCs with Panasonic's PT-AE700E projector for a seriously good time. It has an outstanding combination of an ultra clear wide-screen image and swathe of inputs. BenQ's PE7700 projector took out Best Value honours.

If a projector's on the shopping list, then making your own DVDs should be too. Roxio Easy Media Creator 7.5 and Ulead DVD Movie Factory 4 both make the grade.

OpenOffice and StarOffice have earned a place on these hallowed pages for providing exceedingly good productivity tools.

And GetRight and Download Accelerator Plus are both excellent tools for managing downloads of large files from the Web or FTP.

Best Value

desktop system

### PC Quest The Signature

PC Quest's The Signature has a strong focus on gaming but combines this with a dual core CPU to make it a good all round PC. It has two GeForce 6800 GT cards running in SLI configuration, and its Athlon 64 X2 4200+ CPU performed well under productivity and multimedia benchmarks.

- **CONTACT** PC Quest
- **PHONE** 1300 550 118
- **ONLINE** www.pcquest.com.au
- **PRICE** $4,000

Best Value

cpu/motherboard

### ASUS A7NX-E AMD sempron 2600+

**AMD's entry-level Sempron processors offer a 333MHz FSB and 256KB of level 2 cache. Virus Protection is built in and enabled by Windows XP. Combined with an ASUS A7N8X-E Deluxe motherboard, it's a powerful yet low-cost base platform.**

- **CONTACT** Achieva
- **PHONE** (02) 9747 3288
- **ONLINE** www.achieva.com.au
- **PRICE** Board, $200;CPU, $1,300

Best Value

notebook

### Acer Aspire 1690

The Acer Aspire 1690 features a 1.6GHz Pentium M processor, a 15in wide-screen display running at 1,280 x 800 pixels, Double Layer DVD±RW drive and 60GB hard disk. The base RAM is meagre at 256MB, but you can always add more if you need it. And it only weighs 3kgs.

- **CONTACT** Acer
- **PHONE** 1300 366 567
- **ONLINE** www.acer.com.au
- **PRICE** $2,699

Editor's Choice

desktop system

UPDATED

### Emagen Vitesse SLI

- **CONTACT** Emagen
- **PHONE** 1300 880070
- **ONLINE** www.emagen.com.au
- **PRICE** $3,801



The Emagen Vitesse SLI is an exceptionally well-rounded gaming PC.

The obscene performance levels delivered by the SLI GeForce 6800GT card and Athlon 64 4000+ CPU add to the gaming experience. Under testing it dominated the 3DMark03, 3DMark05, Splinter Cell and Half-Life 2 benchmarks.

The attention Emagen has paid to the Vitesse's details, like the addition of Logitech's cordless MX 3100 keyboard and mouse combo, makes this system a pleasure to use.



Editor's Choice

cpu/motherboard

### ASUS A8N-SLI Deluxe AMD Athlon FX-55

- **CONTACT** Achieva
- **PHONE** (02) 9742 3288
- **ONLINE** www.achieva.com.au
- **PRICE** Board $299 CPU $1,400

ASUS' A8N-SLI Deluxe offers great performance, SLI capabilities, three PCI slots and support for eight SATA II drives using onboard NVRAID.

Audio includes onboard digital and optical S/PDIF outputs. The two Gigabit Ethernet ports have ASUS' AI NET 2 cable fault technology enabled.

The software package includes NVIDIA nTune and Firewall, ASUS PC-Probe and AI Booster, Norton Internet Security 2005, Winbond Voice Editor, and InterVideo WinDVD. Add AMD's Athlon FX-55 processor, and you've got a super-fast solution.

Editor's Choice

notebook

### Toshiba Portégé R200

- **CONTACT** Toshiba
- **PHONE** 13 30 70
- **ONLINE** www.isd.toshiba.com.au
- **PRICE** $3,520




Weighing only 1.15kg, less than 2cm thick, and encased in magnesium alloy, Toshiba's Portégé R200 is designed for ultra-portability. It has a 1.6GHz Pentium M Ultra Low Voltage CPU, 512MB DDR2 memory, Wi-Fi and a 60GB hard drive. It lacks an optical drive, because it would be physically impossible to squeeze one in.

It scored well in battery tests while still delivering robust performance in everyday tasks.

All in all, a wonderful meeting of form and function.

tft screen

## Dell 2405FPW

**CONTACT** Dell **PHONE** 1300 303 107 **ONLINE** www.dell.com.au **PRICE** $1,789

Dell's 16ms, 24in wide-screen LCD monitor is hot. Its 1,920 x 1,200 resolution panel dominates your view, while its plethora of inputs, from DVI to component video, make it ready to cope with most image output devices. There's even a card reader and four-port USB hub. Image quality is superb, with no evidence of ghosting in games or video.

Support for HD video resolutions means this screen will get more useful as HD-capable set-top boxes, game consoles and TV tuners hit the market.




TFT screen

## CMV CT-720D

The CT-720D from CMV is a stylish LCD monitor with above average image quality and a very bright screen, making it suitable for use in environments with lots of ambient light. Add the 8ms refresh rate and supplied 2.5W speakers and you have an excellent value package for gamers.

**CONTACT** Impact Systems

**PHONE** (02) 9621 2999

**ONLINE** www.impactsystems.com.au

**PRICE** $425

NEW category

projector

## Panasonic PT-AE700E

**CONTACT** Panasonic **PHONE** 132 600

**ONLINE** www.panasonic.com.au **PRICE** $3,899



Panasonic's PT-AE700E is the must-have projector for anyone who's serious about big screen movies, television and gaming.

Its 1,280 x 720 resolution is sharp, while the range of AV inputs mean it will partner with gear from the low end all the way up to the new HDMI standard for high definition content.

A 2,000 to 4,000 hour globe means it'll be some time before it needs replacing, even for the hard-core movie buffs. A unit like this will make you the envy of your friends, but they'll be even more impressed when they see Half Life 2 in larger than actual size.

projector

## BenQ PE7700

**BenQ's PE7700 has it all. It packs BNC, HDMI, composite, component, S-Video and a 720p ready resolution.**

**The evenly backlit remote means you'll never press the wrong button.**

**A great quality projector that costs a fraction of its poorer-performing competitors.**

**CONTACT** BenQ

**PHONE** 1300 130 336

**ONLINE** www.benq.com.au

**PRICE** $3,499

handhelds

## HP iPAQ hx2750

NEW category

**CONTACT** PC Quest **PHONE** 1300 550 118 **ONLINE** www.pcquest.com.au **PRICE** $4,000




HP have released a bevy of PDA products, and the pick of the bunch is the iPAQ hx2750 due to its outstanding array of features.

Its small, gunmetal grey body measures 11.9 x 7.7 x 1.6cm (HWD), and weighs just under 165g. This top dog in the world of handhelds sports an Intel PXA270 processor clocked at 624MHz, with 128MB of RAM and 128MB of ROM. It also has built-in Bluetooth and Wi-Fi.

The 240 x 320 pixel display is clear and bright.

handheld

## PalmOne LifeDrive

PalmOne's "Mobile Manager" product takes the tried and true PDA design and marries it to a 4GB hard drive. With a 320 x 480 pixel display, Wi-Fi, Bluetooth and 64MB of RAM, the LifeDrive provides storage capacity galore, plenty of features, and palmOne power in one small package.

**CONTACT** palmOne

**PHONE** (02) 9844 5420

**ONLINE** www.palmone.com.au

**PRICE** $899

adsl modem

## Billion BIPAC 7402

**CONTACT** PC Range **PHONE** (08) 8322 9544

**ONLINE** www.pcrange.com.au **PRICE** $239




One of the new breed of super-fast ADSL2/+ modems, the Billion packs the right combination of features with quick download speeds. You get a four-port switch, Wi-Fi (802.11b), firewall and VPN support.

Importantly, there are enough customisation options to handle multiple PCs, software types and games. Home business users will appreciate the built-in encryption engine.

The BIPAC 7402 averaged an awesome 2,020KB/s in short-range testing (1km), downloading a 635MB file in five minutes.

adsl modem

## Belkin F5D7630au4A

**The F5D7630au4A is one of the best value all-in-one routers available today. Superb out-of-the box functionality, SSID hiding, WPA-PSK and 128-bit WEP wireless security features are all offered. However, there's no print server capability or line filter in the retail box.**

**CONTACT** Belkin

**PHONE** 1800 666 040

**ONLINE** www.belkin.com.au

**PRICE** $300

# BEST BUYS

## optical drive

### Gigabyte GO-W1616A

**The GO-W1616A drive from Gigabyte is capable of both 16x ±R and 4x Double Layer +R burning at a price that makes DVD burning a reality for the masses. It doesn't skimp on the bundle either — Nero 6 OEM Suite 3 and a black face-plate are excellent value extras.**

- **CONTACT** Rectron
- **PHONE** (03) 9561 6166
- **ONLINE** www.rectron.com.au
- **PRICE** $93.95

## external hard disk

### Seagate 5GB Pocket Drive

Sometimes portability outweighs the convenience of having hundreds of gigs of storage space in an external drive. Advances in miniature hard disks have led to Seagate's impressive 5GB Pocket Drive. The entire USB 2.0 unit measures 7cm in diameter so you can take it almost anywhere.

- **CONTACT** Ingram Micro
- **PHONE** (02) 9701 4500
- **ONLINE** www.seagate-asia.com
- **PRICE** $349

## printer

### Canon LASER SHOT LBP-2410

**A desktop colour laser at a price unheard of just two years ago. Rated at 16ppm mono and 4ppm colour, it's perfect for the home or small office. Hi-Smart Compression Architecture means it only needs 8MB of memory to store pages.**

- **CONTACT** Canon
- **PHONE** 1800 021 167
- **ONLINE** www.canon.com.au
- **PRICE** $699

## business server

### Maxtron CSPC-823SATA

This dual Xeon 2.8GHz server comes in a 2U rack-mount enclosure. It features 1GB of RAM and 198GB of disk space in a RAID 5 array, and even includes dual hot-swappable 600W PSUs. It's highly flexible and is a great all-round performer — perfect for small businesses with an eye on the future.

- **CONTACT** Digicor
- **PHONE** (03) 9560 7222
- **ONLINE** www.digicor.com.au
- **PRICE** $4,999.50 (without OS)




## optical drive

### ASUS DRW-1608P

- **CONTACT** ASUS
- **PHONE** 1300 278 788
- **ONLINE** www.asus.com.au
- **PRICE** $129

Fast and feature-packed is the best description for ASUS' DRW-1608P drive. Capable of 6x burning Double Layer discs, this drive wrote 8.5GB of data to a single layer disc in a shade under 19 minutes, at an average speed of 5.84x. It can also burn ±R discs at 16x. And this speed was achieved with the standard 2.4x Double Layer media rather than any specialised 6x discs.

The drive ships with Nero 6 OEM Suite 3 and Ulead DVD Movie Factory 3 SE for basic DVD-Video authoring. A well-rounded offering and the fastest option for those focusing on DL burning.

## external hard disk

### Maxtor Shared Storage Drive

- **CONTACT** Maxtor
- **PHONE** (02) 9369 3662
- **ONLINE** www.maxtor.com
- **PRICE** 2GB, $449



Designed to provide a central storage repository for a home network or small business, this is a comprehensive yet compact package. It's easy to install, with setup handled through a straightforward Web interface. It attaches to the network via Ethernet and even has a couple of USB 2.0 ports at the back.

There are two sizes — a 200GB drive with an 8MB cache, or 300GB with 16MB cache. The drive runs a proprietary stripped-down Linux operating system based on the 2.4 kernel.

## printer

### Fuji Xerox Docuprint C525A

- **CONTACT** Fuji Xerox
- **PHONE** 131 412
- **ONLINE** www.fujixerox.com.au
- **PRICE** $799



Super fast mono printing and brilliant colour make the C525A hard to beat as a replacement for an old mono unit. You get 64MB of memory and a 9,600 x 600 interpolated print resolution — some competitors can only claim 2,400 x 600.

The standard tray can handle 200 sheets, and you can purchase 250- or 500-sheet trays if required. The two-line LCD means settings can be adjusted directly at the printer. It's a little noisy, but the levels are acceptable for most environments.

## business server

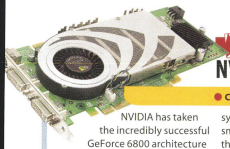
### Plus Titan OP250

- **CONTACT** Plus Corp
- **PHONE** 1800 007 587
- **ONLINE** www.pluscorp.biz
- **PRICE** $4,695




The Plus Titan OP250 is built around dual Opteron 250 CPUs and AMD's 8311/8111 server chipset. It has a generous 2GB of RAM and 223GB of storage thanks to a RAID 0+1 array. All this is packed into a mini-tower case.

It delivered some truly outstanding performance in *APC* Labs' server benchmarks, and has a well-rounded hardware specification. The three-year onsite warranty should give peace of mind to companies lacking a full-time technician to maintain the server.



video card

## NVIDIA GeForce 7800 GTX

**CONTACT** NVIDIA **ONLINE** www.nvidia.com **PRICE** US$599

NVIDIA has taken the incredibly successful GeForce 6800 architecture and overhauled it to deliver the fastest gaming card to ever enter the *APC* Labs.

The GeForce 7800 GTX is capable of making even the most system-intensive game run smoothly at high resolutions, thanks to 24 highly-tweaked pixel shading pipelines.

This PCI Express-only card supports hardware decoding of WMV9 high definition video, and H.264 decoding is just around the corner. Available from a variety of manufacturers, the 7800 GTX features 256MB of GDDR3 memory, dual DVI output and TV-out.

For a truly decadent gaming experience, you can run two cards in SLI mode.

dvd authoring

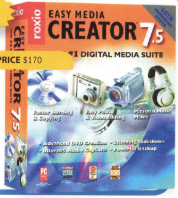
## Roxio Easy Media Creator 7.5

NEW category

**CONTACT** H-Digital **PHONE** (02) 9502 6565 **ONLINE** www.h-digital.com.au **PRICE** $170

Designed to take your existing video clips and package them up into a menu-driven DVD suitable for PC and DVD player viewing, this is essentially a collection of editing features and effects capable of producing high-quality DVD projects.

It has a broad and comprehensive suite of utilities for manipulating digital media; offering powerful tools for editing, menu building, and authoring. It then combines this with ease of use to round out the package.






office productivity

## OpenOffice

NEW category

**CONTACT** OpenOffice.org **ONLINE** www.openoffice.org **PRICE** Free

OpenOffice is a free and open source office productivity bundle of applications licensed under the LGPL. It takes the basic usage of office applications and enables users to create and edit text, spreadsheets, presentations and do basic drawing.

Designed for compatibility, it works seamlessly with Windows, Mac OS, Linux, Solaris and FreeBSD to name a few. Best of all, it's compatible with existing versions of Microsoft Office for file transfer, is natively XML based and won't cost you a cent.

download manager

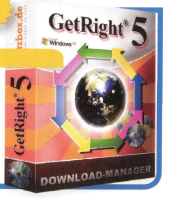
## GetRight

NEW category

**CONTACT** Headlight Software **ONLINE** www.getright.com **PRICE** US$25

The GetRight download manager is capable of resuming interrupted downloads, splitting huge files into sections for easier downloading and throttling speeds to ensure that other Internet services don't take a backseat to a hefty whim.

GetRight can schedule downloads, log into Web sites that have password protection, synchronise Web directories or FTP directory contents with your own, either once-off or regularly.




video card

### Leadtek Winfast PX6600 GT THD 128MB

Offering good gaming performance and value, Leadtek's new Winfast card is quiet and has a solid software package. The PX6600 GT includes 128MB of GDDR3 RAM, a 128-bit memory bus, eight pixel pipelines and DirectX 9's Shader Model 3 support.

- **CONTACT** Impact Systems
- **PHONE** (02) 9621 2999
- **ONLINE** www.impactsystems.com.au
- **PRICE** $425

dvd authoring

### Ulead DVD Movie Factory 4

**An excellent package which offers total ease of use, and a small but effective arsenal of editing tools and video output options. It combines a highly intuitive user interface with a robust feature set to deliver a well-rounded authoring package.**

- **CONTACT** Lako Pacific
- **PHONE** 1800 657 601
- **ONLINE** www.lakopacific.com.au
- **PRICE** $99

office productivity

### StarOffice 7

While similar in nature to OpenOffice, StarOffice is sold rather than given away as a free download. At $199.95, it's a viable option to enterprises and small businesses who may need Microsoft Office compatibility, but don't want to spend as much on software licensing.

- **CONTACT** Sun
- **PHONE** 1800 628 193
- **ONLINE** http://au.sun.com
- **PRICE** $199.95

download manager

### Download Accelerator Plus

**DAP is similar to GetRight, offering many of the same features, but with a built-in FTP client. Integrating with a bar in Internet Explorer, DAP is free with adware. The ad-free DAP Premium can be purchased for US$29.95.**

- **CONTACT** Speedbit
- **PHONE** N/A
- **ONLINE** www.speedbit.com
- **PRICE** Free/US$29.95



# Sub-$4,000 gaming PCs

*John Gillooly* sees just how much entertainment $4,000 can buy.

**six** PCs TESTED

**SUB $4,000**

**RATED CRITERIA:**

- System speed
- Hardware choice
- Graphic prowess
- Game performance
- Peripherals
- Case design

Games push the limits of hardware. From the early days of tweaking Himem.sys in DOS to squeeze an extra few KB out of the system RAM, through the overclocking heyday of the Celeron 300A to modern dual graphics card rigs, gamers have dwelled on the bleeding edge of PC tech. Games push graphics cards, the CPU, RAM and storage like few other applications.

While the primary focus is performance when looking for a games PC, comfortable peripherals, reliability and a host of other factors make for a better gaming experience.

With this in mind, *APC* laid down a challenge to PC vendors — to build a gaming PC with a price cap of $4,000. At this price, the submitted systems' lashings of luxury were quite expected, but their raw power proved that although it doesn't have to cost a fortune to build a competent gaming rig, $4,000 can get you something special.

The overall focus of this Labs Challenge was on performance, although the quality of the entire package was taken into account.

The synthetic benchmarks 3DMark03 and 3DMark05 were used to show how the systems fared relative to each other. Game tests were performed with Half-Life 2 and Tom Clancy's: Splinter Cell Chaos Theory. Both are DirectX 9 games and were used with all the fancy graphics features enabled.

A fair bit of play testing was done with Battlefield 2 and World of Warcraft, but neither of these games are very reliable benchmarks due to their dynamic, primarily online, nature.

This Labs Challenge features a formidable batch of systems, with a fair share of dual graphics card SLI rigs, a smattering of RAID and even a dual core Athlon 64 X2 CPU slipped in for good measure.




THE players

| VENDOR | MODEL | PRICE | ONLINE | PHONE |
|---|---|---|---|---|
| 1. Emagen | Vitesse SLI | $3,801 | www.emagen.com.au | 1300 880 070 |
| 2. PC Quest | The Signature | $4,000 | www.pcquest.com.au | 1300 550 118 |
| 3. Plus Corp | Alter FX-57 Gamers Edition | $3,999 | www.pluscorp.biz | 1800 007 587 |
| 4. Pioneer | Pandora SLI | $3,999 | www.pioneercomputers.com.au | (02) 9690 2888 |
| 5. Altech | Game Force Commander | $3,995 | www.altech.com.au | (02) 9735 5655 |
| 6. Dell | Dimension 9100 | $3,599 | www.dell.com.au | 1300 303 107 |

| MODEL | APC TEST 1 | APC TEST 2 | APC TEST 3 | APC TEST 4 |
|---|---|---|---|---|
| | 0 200 | 0 200 | 0 200 | 0 200 |
| Plus Corp | 78.83 | 118.41 | 56.32 | 116.97 |
| Dell | 51.56 | 81.49 | 38.08 | 70.12 |
| Pioneer | 69.97 | 105.04 | 50.72 | 105.9 |
| Altech | 70.32 | 99.75 | 74.88 | 137.43 |
| PC Quest | 81.07 | 108.59 | 80.26 | 166 |
| Emagen | 94.42 | 128.36 | 80.21 | 185.71 |

**Half-Life 2**
**Emagen rules the roost under HL2 benchmarks.**

While these systems have made *APC* Labs' gaming-obsessed staff a little depressed at the state of their personal PCs, we still enjoy seeing really high benchmark scores and the occasional blue LED.

## PERIPHERALS

With such a diverse range of systems, even the simple act of unpacking the boxes was laced with surprises. Four of the units were supplied with 19in 1,280 x 1,024 resolution LCDs. PC Quest and Dell were the exceptions, with the former supplying a 19in CRT and the latter bundling a 17in LCD.

From one perspective, fast refresh rates and the space-saving nature of LCD screens mean they are great for gaming, however, CRTs support resolutions above 1,280 x 1,024. Most modern video cards don't really start to shine until they hit 1,600 x 1,200, but this can be mitigated somewhat when they're locked to lower native resolutions by the heavy use of anisotropic filtering and antialiasing to soak up every spare clock cycle on the video card.

Perhaps the most surprising thing was the sheer variety of keyboards and mice included, some of which showed excellent attention to detail. Pioneer's use of the latest mouse in the much-beloved MX500 series of gaming mice from Logitech, the MX518, was a pleasant surprise. But the most impressive inclusion was Emagen's Logitech wireless keyboard and mouse combo.

This pairs a nicely laid out keyboard with a MX1000 wireless laser mouse, widely acknowledged as the cream of the wireless mouse crop when it comes to gaming. This went some way towards mitigating the disappointment at Pluscorp's inclusion of a Microsoft "comfort edition" wireless keyboard and mouse combo, which paired one of the more recent pseudo-ergonomic keyboards with a standard Microsoft optical mouse.

This kind of setup is fine for desktop use; however Microsoft wireless mice are notoriously poor for gaming due to a low refresh rate that translates to jerky onscreen movement. While the keyboard is much better for gaming than the previous generation ergonomic Microsoft keyboards, most gamers prefer as plain a keyboard as possible (think old beige Honeywell-style ones).




**John Gillooly play-tests some of the latest games.**

## CASE DESIGN

At the more conservative end of case design was Dell's black, silver and white BTX case and the Antec TX1088AMG case used by Emagen.

Others went down the big, brash and illuminated route; Plus Corp used a Thermaltake Armour VA8000BWS case liberally sprinkled with blue LED-infused fans, while Altech took Antec's P160 case, threw in a Corsair water cooling kit and lit the whole thing up with a red cold cathode light (which can be killed by flicking a switch on the back of the case).

Pioneer and PC Quest went for smaller Coolermaster cases — Pioneer used a Centurion 5, but PC Quest's Centurion 530 case deserves mention for the highly functional metal handles that run the length of the case front.

These are perfect for gamers who like to take their PCs to LAN gaming events.

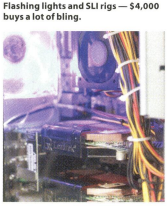
## HARDWARE CONFIGURATIONS

Inside these boxes lay a plethora of hardware configurations, providing a fascinating insight into what hardware is perceived to target a gamer's needs. Altech and Dell were the only participants in the roundup to use Intel processors, the rest using Athlon 64 processors. Of these, the PC Quest's Athlon 64 X2 4200+ and Plus Corp's Athlon 64 FX-57 were standouts for sub-$4,000 machines.

In an SLI-driven turnaround, ATI was grossly underrepresented in the video card department with Altech the only system builder to use a Radeon X850XT PE video card.



**Flashing lights and SLI rigs — $4,000 buys a lot of bling.**



## THE BIG 4



### Battlefield 2

**Currently the darling of the online first person shooter community, Battlefield 2 is a multiplayer focused game for up to 64 players at a time. The success of the Battlefield series of games comes down to a good balance between traditional on-foot first person shooter action and the ability to drive a variety of vehicles from tanks to jetfighters to help your team win.**

### Counter-Strike: Source



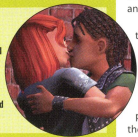
**Based upon the Half-Life 2 game engine, Counter-Strike: Source is an updated version of Counter-Strike, which has been the runaway hit of the multiplayer gaming scene since it launched over six years ago. This multiplayer first person shooter pits teams of players against each other in a series of five minute, objective-based rounds with a counterterrorism theme.**



### World of Warcraft

**Over two million people worldwide subscribe to Blizzard's massively multiplayer opus. Based upon a long running and highly successful series of Real Time Strategy games, World of Warcraft is a third person online roleplaying game with roughly 20,000 people per server all coming together to make a constantly evolving, dynamic, interactive world.**

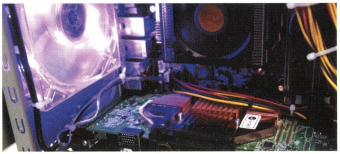
### The Sims 2



**Electronic Arts "Life Simulator" has been another standout game of recent years. The sequel was released late last year and has garnered a strong following thanks to regular expansion pack releases. Much more sedate than most games, the Sims 2 has you managing the life of a household, seeing to their wants, needs and desires while improving their quality of life.**



PC Quest's The Signature matches a CRT with Cooler Master case styling.



Optimal airflow is required to keep the systems cool and stable.



Water-cooling keeps chips cooler, but makes transport difficult.

Plus Corp and Pioneer used a single NVIDIA GeForce 6800 Ultra card, while Dell fitted a solitary GeForce 6800 card. The Emagen and PCQuest systems used two GeForce 6800 GT cards running in an SLI configuration.

During the process of getting the systems set up, booted and the benchmarks installed, one curious discovery was made. The Plus Corp system had shipped with Windows XP Professional x64 Edition, which proved to be incompatible with the commonly-used Starforce copy protection scheme.

In this case, it failed when attempting to install Tom Clancy's Splinter Cell: Chaos Theory. As a result, Windows XP Professional was installed on the Plus Corp system and all benchmarks were run using this.

To run the Battlefield 2 tests, the drivers had to be updated to the latest versions, so the newest possible WHQL-certified video drivers were installed on all the systems.

### SYNTHETIC TESTING

The first round of tests used the synthetic 3DMark03 and 3DMark05 benchmarks. Both versions are used as each targets a slightly different generation of game development.

3DMark03 was released just as the first DirectX 9 hardware reached the market, so its tests are more focused on the development techniques used in today's games. 3DMark05 is designed to provide a rough prediction of game performance in the near future, and as such is developed using techniques that will emerge in the next generation of game titles.

As the results show, 3DMark is a video card-sensitive benchmark. In both tests, the SLI setups from Emagen and PC Quest dominated the other PCs by a significant margin. Emagen snuck ahead of PC Quest mainly due to the Athlon 64 4000+'s 2.4GHz clock frequency, compared to the 2.2GHz of the dual-core Athlon 64 X2 4200+.

For third place, the Plus Corp and Altech systems were closely matched, with Pioneer not far behind. Dell's Inspiron 9100 was the most sluggish of the systems, with its score less than half of those from Emagen and PC Quest. This was due to its use of a slower GeForce 6800 graphics card, which has eight pixel shading pipelines compared to the 16 pipelines of the GeForce 6800 Ultra and 12 of the GeForce 6800GT.

### GAMES TESTING

The first game test was done with Tom Clancy's Splinter Cell: Chaos Theory. It was chosen for



3DMark05 is a good indicator of next-generation game performance.

| MODEL | TIMEDEMO 0 70 | 3D MARK 03 0 20,000 | 3D MARK 05 0 10,000 |
|---|---|---|---|
| Plus Corp | 41.65 | 13086 | 5708 |
| Dell | 21.14 | 8960 | 3794 |
| Pioneer | 39.33 | 11943 | 5269 |
| Altech | ??.?? | 12649 | 5995 |
| PC Quest | 66.32 | 18974 | 8706 |
| Emagen | 66.40 | 19613 | 9193 |

**Emagen's Vitesse SLI**
**Trounces the competition in Splinter Cell and synthetic benchmarks.**



its popularity as well as the way it has been made. Based around the Unreal games engine, it's a graphically advanced game with support for the most advanced version of DirectX 9, called Shader Model 3.0. As such, it gives a good indication of a system's performance in a range of real world game titles.

Once again the SLI rigs from Emagen and PC Quest dominated the benchmarks, although (unlike 3DMark) the influence of the different CPUs didn't play a part and both systems ended up with near identical scores.

The Plus Corp and Pioneer systems both delivered good performance but lagged behind the SLI systems by a significant margin. The Altech system scored in a similar range, however, an issue that later emerged with its RAID array meant the results couldn't be recovered.

Again, Dell's system was outclassed by the rest of the pack, with only a third the framerate of the SLI systems.

Half-Life 2 is a curious benchmarking tool. It definitely favours ATI graphics hardware, thanks largely to a close relationship and a bundling deal with the Canadian 3D chip maker. But more than that, its performance oscillates between being CPU and video card-dependant, leading to an interesting pattern of results depending upon the onscreen action.

Four separate Half-Life 2 time demos were run. The first was recorded during a "hoverboat" sequence in the game, where players race along a series of canals. This isn't a particularly graphically taxing sequence, but it reflects the influence of CPU power more accurately than Splinter Cell. Emagen's system came out on top again, however, Plus Corp's FX-57 helped drag it to a score on par with PC Quest's.

The second demo was recorded during a gunfight in a darkened room. The strain is placed mainly upon the CPU, which again lifted Plus Corp into second place behind Emagen.

However, this changed dramatically in the third test, which was from a graphically taxing sequence in the game. It showed how Half-Life 2-friendly the Altech's ATI Radeon X850XT PE card was, with it almost pipping the SLI rigs in framerate tests. The other systems scaled in a similar way to the first Half-Life 2 test.

The fourth test was a real system cruncher, and it gave both the graphics engine and CPU a workout. The results almost mirrored those seen in the 3DMark tests — Emagen's system just pipped PC Quest's for first place. Altech, Plus Corp and Pioneer filled the middle ranks, and Dell showed consistency by delivering less than half the performance of the SLI systems.

## THE VERDICT

Occasionally, a Labs Challenge can end in the decision that none of the products truly delivered, but that wasn't the case here. Between benchmark runs, lunchtime World of Warcraft quests and some after-hours Battlefield 2 shenanigans, the *APC* Labs team spent a fair amount of time with these systems and had very little to complain about.

Even Dell's Inspiron 9100, with its consistent last place in benchmark results, delivered smooth framerates and decent eye candy — although the fact that it shipped with a 17in LCD monitor is still confusing. Dell does have better gaming systems in the form of its XPS range, however, at the time of testing it was between generations and there were no Generation 6 samples available.

The rest of the systems can be broken into two distinct packs. Pioneer, Plus Corp and Altech all delivered well-rounded systems that would please any gamer. Plus Corp impressed us by squeezing in an FX-57 CPU and GeForce 6800 Ultra, and this system will excel in games where the CPU is a bottleneck.

While the Altech offered impressive performance, its water-cooling system means you need to carefully consider how you're going to put the PC to use. Water-cooling makes for a quiet system,

and it should go a long way to mitigating the thermal throttling issues that high load activities like games can cause with the Pentium 4 CPU. However, a boxed system emblazoned with labels indicating which side is up suggests that, once unpacked, the PC shouldn't be moved around much. This could be a problem if you want to attend LAN events or take it to a mate's place for some multiplayer action.

Even though the pack performed admirably, there were two systems that stood out. The winner of the Highly Recommended award is PC Quest's The Signature. Not only did it deliver excellent performance thanks to its SLI GeForce 6800 GT card, its Athlon 64 X2 4200+ CPU performed well in the single threaded benchmark tests. Once multithreaded games begin to emerge this system will blossom.

Taking out the Editor's Choice award is the Emagen Vitesse SLI, which is an exceptionally well-rounded system. Small touches like the MX 3100 Wireless Keyboard and Mouse combo combined with the obscene performance levels delivered by the SLI GeForce 6800GT card and Athlon 64 4000+ CPU adds to the PC gaming experience. ETTC

| | EMAGEN VITESSE SLI | PC QUEST THE SIGNATURE | PLUSCORP ALTERA FX-57 GE | PIONEER PANDORA SLI | ALTECH G FORCE COMM. | DELL DIMENSION 900 |
|---|---|---|---|---|---|---|
| **CPU** | Athlon 64 4000+ | Athlon 64 X2 4200+ | Athlon 64 FX-57 | Athlon 64 3500+ | Pentium 4 660 | Pentium 4 650 |
| **CPU frequency** | 2.4Ghz | 2x 2.2Ghz | 2.8Ghz | 2.2Ghz | 3.6Ghz | 3.4Ghz |
| **Motherboard** | ASUS A8N-SLI Premium | ASUS A8N-SLI Deluxe | ASUS A8N-SLI DELUXE | MSI K8N SLI Diamond | ABIT AA8XE Fatal1ty | OEM Dell motherboard |
| **Chipset** | NVIDIA nForce4 SLI | NVIDIA nForce4 SLI | NVIDIA nForce4 SLI | NVIDIA nForce4 SLI | Intel 925XE | Intel 945P |
| **RAM** | 1GB DDR400 | 1GB DDR400 | 1GB DDR400 | 2GB DDR400 | 1GB DDR2 | 1GB DDR2-533 |
| **Video card** | 2x Leadtek GeForce 6800GT | 2x Leadtek GeForce 6800GT | GeForce 6800 Ultra | 2x Leadtek GeForce 6800 Ultra | RADEON X850XT | 256MB NVIDIA GeForce 6800 |
| **Audio** | Realtek AC'97 | Realtek AC'97 | Realtek AC'97 | Onboard Soundblaster Live! | ABIT AudioMAX | Soundblaster Audigy 2 ZS |
| **Storage hardware** | Western Digital 200GB HDD | 2x 200GB ST3200826AS | 2x 160GB Seagate NCQ SATA drives | 2x 160GB Seagate HDD | 2x Seagate 160GB 5Y 8M-27AS | WDC WD2500JD-75HB80-233GB |
| **Storage configuration** | Single drive | RAID 0 | RAID 0 | RAID 0 | RAID 0 | Single drive |
| **Optical drive** | Pioneer DVR09 16x/DL burner | 16x black DVD ROM, Pioneer DVR-109 16x | Sony DWD26A 16x/DL DVD burner | Pioneer A09 DRD-RW | LG 16X +/- RW/RAM DVD burner | 16x DVD burner |
| **Ethernet adaptors** | 1x GbE | 2x GbE | 2x GbE | 2x GbE | 1xGbE, 1x 10/100 | 1x 10/100 |
| **Monitor** | Samsung 913B 19in LCD | Viewsonic P95F+B 19in CRT | HYUNDAI ImageQuest L90D+ 19in LCD | HYUNDAI ImageQuest L90D+ 19in LCD | Samsung 913N 19in LCD | 17in Dell 1704FPT |
| **Keyboard/mouse** | Logitech cordless desktop MX3100 | Logitech Black Internet Keyboard | Microsoft Black Optical Desktop Comfort | Logitech MX518 Optical mouse | Microsoft Black Optical Value Pack 2.0 | Wired Dell Keyboard and Mouse combo |
| **Extra features** | N/A | N/A | Logitech X-620 speaker | Bluetooth and 802.11g wireless | Corsair Water Cooling Kit | N/A |
| **Best value** | 3rd | 1st | 4th | 2nd | 3rd | 2nd |
| ✔ | High performance hardware and great gaming peripherals. | Dual core CPU and fast graphics. | Gaming focused sound card. | High end graphics; good gaming mouse. | Water-cooled showpiece PC. | Fastest desktop CPU on the market. |
| ✖ | Integrated sound. | CRT monitor seems unwieldy. | Tiny monitor and underpowered graphics. | Lower end CPU. | Difficult to move around. | Poor quality gaming mouse. |
| **Verdict** | ★★★★½ | ★★★★☆ | ★★★½☆ | ★★★½☆ | ★★★☆☆ | ★★☆☆☆ |




# WD SATA promo

10 Sep - 31 Oct 2005

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# Home theatre projectors

Want to swap your TV for a big screen experience? *Dan Chiappini* gives you the lowdown on home entertainment projectors under $5,000.

**twelve** PROJECTORS TESTED

**SUB $5,000**

**RATED CRITERIA:**

- Colour reproduction
- Contrast ratio
- Image quality
- Resolution
- Connectivity

The impact of watching movies at home on a big screen rather than a TV is infinitely more powerful. A decrease in the price of "home theatre-in-a-box" equipment paired with the high cost of cinema tickets have prompted people to buy surround sound systems and DVD players to bring the movies to the lounge room.

Not long ago the price of home entertainment projectors went below $2,000 and now there's a flood of units available for the same cost.

*APC* sent out the call for home entertainment projectors under $5,000. The closer a projector came to the target price, the better for comparative analysis. At this price point, contenders had 1,280 x 720 wide-screen resolutions, 4,000 hour lamp running times and a swag of input options.

But it's not that simple, there are specs and features to weigh up, HDMI, DVI, progressive scan and anamorphic display modes. It's enough to do your head in before you've even started. But the Labs team have done the legwork for you by testing 12 of the hottest projectors around.

## SOURCES FOR COURSES

While it's important to consider the display quality being output when shopping for a projector, it's even *more* important to remember the quality of the source equipment that you're putting in. Sure a $5,000 projector means big, but does it mean better? Much like when purchasing a camera, your photos will only be as good as your lens — think about your DVD player before throwing your first movie night.

Obviously, suitably matching source equipment was required to drive the home




THE players

| | VENDOR | MODEL | PRICE | ONLINE | PHONE |
|---|---|---|---|---|---|
| 1. | HP | Home Cinema EP9012 | $4,999 | www.hp.com.au | 13 23 47 |
| 2. | Toshiba | MT200 | $2,999 | www.toshiba.com | 1300 733 962 |
| 3. | Mitsubishi | HC900 | $3,599 | www.mitsubishi-electric.com.au | (02) 9684 7777 |
| 4. | Viewsonic | PJ55D | $4,470 | www.viewsonic.com.au | (02) 9906 6277 |
| 5. | Sony | VPLHS50 | $4,499 | www.sony.com.au | 1300 137 669 |
| 6. | BenQ | PE7700 | $3,499 | www.benq.com.au | 1300 130 336 |



entertainment projectors. *APC* selected the DV-S969AVI ($1,499; **www.pioneeraus.com.au**) for its integrated HDMI and 14-bit video D/A converter, which resulted in lowered video noise and reduced the chance of video artefacts being mistaken for projector shortcomings.

## HOW WE TESTED

*APC* Labs used a series of real-world tests. Ratings were given according to each projector's performance under criteria such as colour reproduction, contrast ratio, brightness, resolution and connectivity.

Each projector was connected to the Pioneer DV-S969AVI using the highest quality video option available. While each projector could have been tested with the commonly found composite video out, it would have put the units with HDMI, component video and BNC at a significant disadvantage for quality comparison. Each projector was placed 2.9 meters from the screen to ensure light measurement uniformity. A lux meter was used to measure light intensity in each projector's native resolution.

Two types of projectors were tested in this roundup — LCD and DLP (see "LCD versus DLP", page 64). The LCD projectors included the Panasonic PT-AE700E, Sanyo PLV-Z3, Epson EMP-TW200H and Sony VPLHS50. The DLPs are the Dell 2300MP, HP Home Cinema Projector ep9012, Viewsonic PJ755D, BenQ PE7700, NEC HT510G, Mitsubishi HC900, Toshiba TDP-MT200 and Infocus ScreenPlay 5700.

Three movies were used to analyse the different problems which can occur during projection. *Aliens 3* is a dark film, with many spotlight sources and shadows. *We Were Soldiers* consists mostly of scenes in natural daylight, and quality projectors should show a range of colours, particularly the olives, greens and browns of the landscape without washing out skin tones. Fast-paced battle scenes show up any problematic issues with motion blur and image tearing.

*The Incredibles* uses a wide range of bright colours that highlight the colour saturation to contrast ratio performance. It also helped show off the brightness of the surrounding colours and evenness of skin tones. The night scenes, which typically have multiple light sources, help to evaluate black levels and fine detail.

## COLOUR REPRODUCTION

When it came to assessing colour reproduction, the LCD projectors from Panasonic, Sanyo and Sony each produced even, natural skin tones. Those from the Epson EMP-TW200H appeared slightly stepped, with colour gradients appearing in the *We Were Soldiers* test. LCD projectors typically produce rich, vibrant colours without oversaturation, and each of the four LCD units in this roundup performed well, bringing out the various subtle shades of green, brown and khaki of the soldiers' uniforms amongst green vegetation and sandy soil.

DLP units were a bit of a mixed bag. BenQ's PE7700, Infocus' ScreenPlay 5700, Toshiba's TDP-MT200 and Mitsubishi's HC900 all produced good quality colour reproduction across the board. The Mitsubishi reproduced colours vividly, making the experience of watching a film extremely immersive. Despite using the same technology, HP's Home Cinema Projector ep9012, Viewsonic's PJ755D and Dell's 2300MP appeared slightly washed out and pale in comparison.

## CONTRAST RATIO

While you can blindly accept each manufacturer's contrast ratio claim, it's highly unlikely that you will run your projector at full on (white) and full off (black), so there's no value in testing that way.



| VENDOR | MODEL | PRICE | ONLINE | PHONE |
|---|---|---|---|---|
| **7.** NEC | HT510G | $3,154 | www.nec.com.au | 13 16 32 |
| **8.** Sanyo | PLV-Z3 | $3,699 | www.sanyo.com.au | 1300 360 230 |
| **9.** Panasonic | PT-AE700E | $3,899 | www.panasonic.com.au | 13 26 00 |
| **10.** Epson | TW200H | $3,799 | www.epson.com.au | (02) 8899 3666 |
| **11.** Int. Dynamics | Infocus ScreenPlay 5700 | $4,999 | www.myinfocus.com.au | 1800 456 393 |
| **12.** Dell | 2300MP | $2,899 | www.dell.com.au | 1800 812 393 |

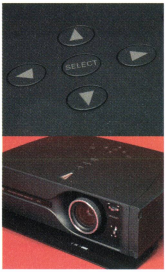




**Panasonic PT-AE700E**
**A front-mounted joystick makes lens shift a snap.**



**HP Home Cinema EP9012**
**It may look like a UFO but the real surprise is how much tech is inside.**



**Sanyo PLV-Z3**
**The Z3's flip-up lens cover means you don't have to worry about scratches and dust.**



**Epson TW200H**
**Easy to access menu buttons on the top of the unit let you tweak your settings.**

The ANSI (American National Standards Institute) test was fired up in the *APC* Labs, which is comprised of a 4 x 4 grid with alternating black and white squares. The maximum and minimum brightness levels were measured using a lux meter. Each projector was tested in its native resolution, as operating each outside of this tended to vary brightness levels without any clear pattern emerging.

Of course brightness is important, but the brightest unit isn't always the best performer. While the Viewsonic PJ755D had the brightest contrast ratio overall at 87:1, it produced below average visibility in the low light scenes.

Taking out second place with 82:1, Infocus' offering handled low light conditions well by clearly displaying facial details and backgrounds.

The BenQ PE7700 followed closely with 81:1 ratio, bringing out fine lines in the darkened halls of *Aliens 3* and the night scenes of *The Incredibles*.

Dell's 2300MP ultra portable took fourth place in the contrast stakes with 74:1, showing good detail in low light but suffered from poor black levels.

Toshiba's TDP-MT200 and Mitsubishi's HC900 were separated by only a single point, at 64:1 and 63:1 respectively, despite the HC900 boasting twice the ANSI brightness on paper.

Panasonic, HP, Sanyo, Epson and NEC all scored between 55:1 and 50:1, and Sony brought up the rear at 42:1.

Most of the bottom rung performers were LCD units which were less capable of reproducing accurate black levels and detail in darkened scenes in line with technology shortcomings.

## IMAGE QUALITY

This Labs Challenge proved that there is good performance to be had, and it has disproved to some degree the old adage of "you get what you pay for". Panasonic's PT-AE700E, Sanyo's PLV-Z3 and BenQ's PE7700 are all below $4,000 and offer the best features and performance. (Panasonic's replacement globe cost was the second highest at $659, but as it's

## LCD VERSUS DLP

**Liquid Crystal Display (LCD) is the older of the two technologies and works by housing glass panels inside the unit and bouncing light across all the red, blue and green coloured panels as required before outputting the image through the lens. Light passing through the panels can be opened and closed to allow more or less through, adjusting the light levels and colour intensity.**

**LCD technology provides better colour saturation, sharper images and higher ANSI lumen outputs than comparable DLP units. However, LCD suffers from poor contrast and black level reproduction, and is susceptible to the "screen door" effect — visible pixellation of images. Screen door causes you to see between pixels when the resolution isn't high enough. Manufacturers are counteracting this by increasing the display resolutions to reduce gaps.**

**Although LCD has its faults, it's the most common projection method and is often found in cheaper home entertainment units, making it suitable for those on a shoestring budget.**

**Digital Light Processing (DLP) relies on a single chip and colour wheel to produce its display. DLP projectors have thousands of tiny wobbling mirrors mounted internally, each representing a pixel and using angles to control whether light is bounced towards the lens (to lighten) or away from the lens (to darken).**

**DLP doesn't require three separate lenses for the RGB channels (although high-end DLP projectors do have a chip for each colour) and can be built into much smaller housing, making it more portable.**

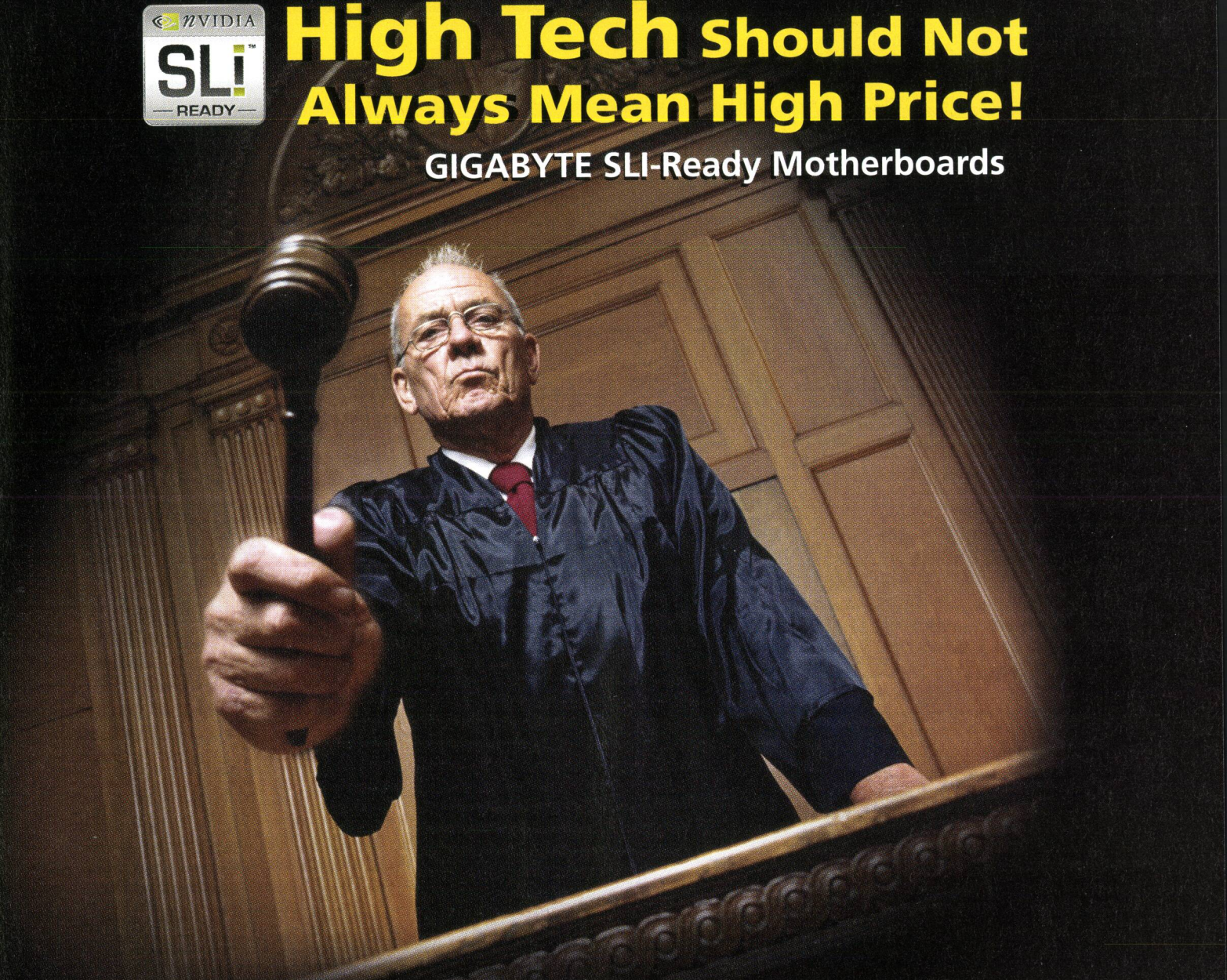
**The technology is also capable of producing high contrast blacks (which appear much deeper than equivalent LCD units), winning them plenty of support from serious home theatre enthusiasts. This has been further improved from last generation DLP with the addition of a black substrate under the mirrors and a slight alteration of the tilt angle for better performance.**

**While LCD displays all three primary colours simultaneously using its panels, DLP only has a single spinning colour wheel. The wheel spins at over 3,600rpm (approximately 60Hz) and refreshes each colour more than 60 times a second. These first generation units are often advertised as 1x colour wheels. Current generation parts use six-segment colour wheels turning at 7,200rpm (120Hz) or 2x. By doubling the number of colours on a segment wheel, the appearance of the "rainbow effect" can be reduced by having two reds, blues and greens. These are often referred to as 4x devices.**

**Since the rainbow effect can cause eye-strain and headaches, ask for a demonstration of the unit you're thinking of buying. Flick your eyes around as you watch and check for artefacts or colour blurring.**

# High Tech Should Not Always Mean High Price!

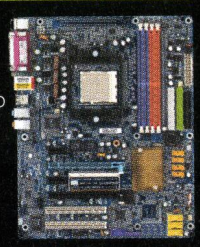
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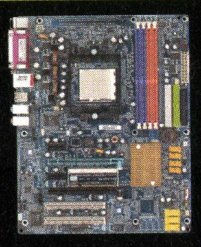
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- NVIDIA SLI Multi-GPU function
- Dual Channel DDR400
- NVIDIA SATA 3.0Gb/s and RAID
- Gigabit Ethernet Solution
- NVIDIA ActiveArmor™ powered Firewall
- IEEE1394b FireWire interface
- 8 Channel Audio



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**BenQ PE7700**
**Fairly unassuming on the outside, instant cinema within.**

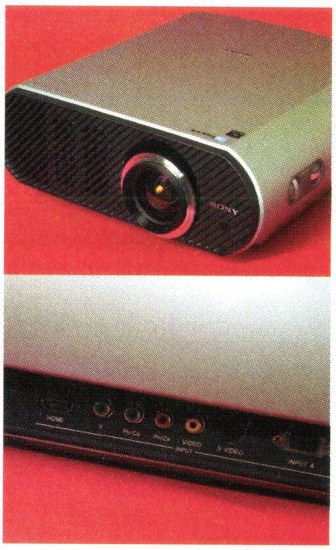
**Mitsubishi HC900**
**DVI-D with HDCP means it's ready for next-generation content protection.**






**Dell 2300MP**
**Small enough to throw in a briefcase or backpack, take it anywhere you go.**

**Sony VPLHS50**
**Active Iris helps correct some of the LCD's pitfalls.**



unlikely that you'll be watching these units eight hours a day, it'll be close to 1,000 movies before a replacement bulb is needed.)

The gaming portion of the tests showed very little difference between the projectors, the real limitation coming more from your PC's ability to render the image. Half-Life 2 was played on each, and showed lower brightness and contrast units were only marginally disadvantaged for performance.

Panasonic's PT-AE700E performed best throughout the video tests, producing only minor artefacts and motion blur, its quality and cost making it a shoo-in for the Editor's Choice award.

BenQ's PE7700 was hot on its heels, thanks to its picture-in-picture (a small window in the corner of the main window showing a second picture source) and picture-by-picture (effectively a split screen of two picture sources), similar to that of the Dell 2405FPW monitor (see *APC* September, page 44). It was also characterised by rich colours, sharp images and generous low-light detail.

Sanyo and Mitsubishi's offerings both had good colour and low-light detail reproduction, but suffered slightly at the hands of motion blur and image tearing. Although text files were legible, the Mitsubishi produced a desktop that was difficult to read.

Sony's Active Iris technology helped its VPLHS50 produce better than expected detail in low-lit movie scenes, but black levels did suffer when it was enabled.

Viewsonic's PJ755D and HP's Home Cinema Projector ep9012 all-in-one entertainment unit both struggled in low light, with fine detail becoming lost. Both units exhibited motion tearing, particularly in *We Were Soldiers'* battle and fast action scenes.




**Toshiba MT200**
**The white finish is sure match all of your Apple products.**

**Infocus ScreenPlay 5700**
**Two sets of component inputs provides quality without a cabling nightmare.**







**Viewsonic PJ755D**
**Bright enough to burn your favourite movie into your retinas forever.**

**NEC HT510G**
**Thin enough to slip between two couches, simply slide it out when you want to watch.**



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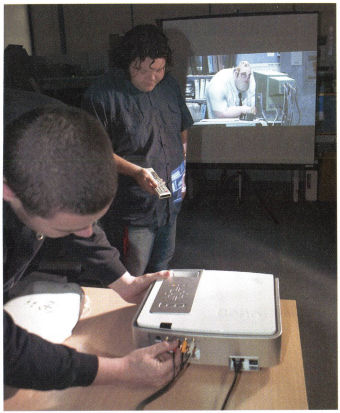
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Dell's 2300MP is the cheapest unit here, but it's obvious some compromises have been made. While not the lowest resolution projector, it showed signs of the "screen door" effect (visible pixellation from a low resolution) and coloured gradient stepping. However, it did impress us with its detail in low-light scenes, and its small footprint makes it a portable, inexpensive unit.

Epson's EMP-TW200H performed well with dark scenes, but it tore during fast movements. NEC's HT510G also suffered from the same issue, exaggerating blur during dark scenes. The desktop text was also difficult to read, but the text files were much easier to distinguish.

Toshiba's TDP-MT200 and Infocus' ScreenPlay 5700 were good at displaying night scenes but came undone in *Alien 3*'s steamy scenes. The picture became clumpy and pixellated. The Infocus' colours were vibrant and its manual phase control was handy for making fine adjustments.

## CONNECTIVITY

Another major pre-purchase factor to consider is a projector's suitability for plugging in to your home entertainment devices. VGA via D-sub is a common input across the board and the easiest way to connect your PC for big screen gaming. All units in this roundup have RCA composite connectors, which are found on televisions, DVD players and gaming consoles. And each of the projectors, except for the Dell 2300MP, featured component video inputs (a step up in quality from composite video) which splits the video signal into individual RGB channels. Dell counters this by offering a single S-Video socket for those unhappy with composite.

The Sanyo and Infocus units both offer dual component input and allow you to have two different sources (such as an Xbox and a DVD player) connected without the need to unplug every time you'd like to use something else.

Panasonic, Sanyo, BenQ and Sony's projectors all have High-

| | DELL 2300MP | PANASONIC PT-AE700E | HP HOME CINEMA EP9012 | VIEWSONIC PJ755D | SANYO PLV-Z3 | EPSON TW200H |
|---|---|---|---|---|---|---|
| **Technology** | DLP | LCD | DLP | DLP | LCD | 3-LCD |
| **Native resolution** | 1,024 x 768 | 1,280 x 720 | 800 x 600 | 1,024 x 768 | 1,280 x 720 | 1,280 x 720 |
| **Contrast ratio** | 2,100 | 2,000 | 1,600 | 2,000 | 2,000 | 1,000 |
| **Brightness (ANSI)** | 2,300 | 1,000 | 840 | 2,800 | 800 | 1,500 |
| **Bulb life** | 2,000 hours (2,500 in eco) | 2,000 hours (4,000 in eco) | 4,000 hours in eco | 2,000 hours (3,000 in eco) | 2,000 hours (3,000 in eco) | 2,000 hours (3,000 in eco) |
| **Bulb cost** | $420.20 | $659 | $459 | $460 | $499 | $799 |
| **Product warranty** | 1 year | 2 years | 1 year | 3 years | 2 years | 2 years |
| **Video connections** | D-sub VGA input; D-sub VGA output; composite video; USB; 3.5mm mini jack input; S-Video | HDMI; D-sub VGA input; S-Video; composite video; component video; SCART | Composite video; USB; S-Video; component video; DVI-1; 5.1 audio out; 3.5mm mini jack input | DV-1 input; D-sub VGA input; USB; D-sub VGA output; S-Video; component video; composite video; 3.5mm mini jack input / output | HDMI; composite video; 2x component video; S-Video; D-sub VGA input | S-video; D-sub VGA input; component video; USB; composite video |
| | | Editor's Choice October 2005 apc | | | | |
| ✔ | Good low light detail; well priced. | Good black levels; excellent performance. | Complete home theatre-in-a-box. | Picture in picture; high brightness. | Good colour; dual component input. | Good low-light detail. |
| ✖ | Limited inputs; low resolution. | Expensive lamp replacement cost. | Low resolution; expensive. | Struggles in low light. | Suffers from motion blur. | Expensive replacement globe. |
| **Verdict** | ★★★☆☆ | ★★★★½ | ★★★☆☆ | ★★★☆☆ | ★★★½☆ | ★★★☆☆ |

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Definition Multimedia Interface (HDMI) sockets. HDMI is a new method of digital signal delivery which, like SCART, carries both an audio and video signal. HDMI is backwards compatible with the DVI interface but it can also carry up to eight channels of uncompressed digital audio and high definition video in a single cable. HDMI will be used in conjunction with HDCP content protection for next generation playback to help stamp out piracy with a keyed encrypt/decrypt system.

BenQ's PE7700 was the only projector to feature composite, component, S-Video, HDMI and BNC interfaces, providing a wide range of interoperability with any level of source equipment.

While not an exceptional performer, HP's Home Cinema Projector ep9012 stood out not only for its mammoth size but for providing a home theatre-in-a-box experience. The unit packs a 2.1 sound system with subwoofer and its own DVD player. Although



it didn't take out top marks in this Labs Challenge, HP's ingenuity deserves some recognition.

## CONCLUSIONS

While no unit in this roundup was flawless, the features of the award winners were pretty close to perfect.

The size and portability of Dell's 2300MP are worth commending, however, its image quality left a little to be desired.

And although HP's Home Cinema Projector EP9012 packs in plenty of tech, it is bulky and expensive, and the video resolution was a little lacklustre.

Viewsonic's PJ755D was bright, but its laser pointer remote control and scroll wheel make it more suited for boardroom use.

Epson's EMP-TW200H is well priced for a 1,280 x 720 resolution projector. However, it came unstuck against some very capable video competition. Aside from that, the $799 globe will definitely hurt your pocket when it's time for replacement.

NEC's HT510G and Infocus' ScreenPlay 5700 were similarly specced, and even though the ScreenPlay has an edge with its additional set of S-Video and component video inputs, the $4,999 price tag is hard to swallow when there are cheaper units with comparable performance.

The sub-$3,000 Toshiba TDP-MT200 may sound appealing, but it has a high replacement globe cost and a low resolution.

Panasonic's PT-AE700E isn't the cheapest projector here, but it offers plenty for its price. The globes are $659 a pop, but occasional users won't need a replacement for some time. Its excellent on-screen performance made it well-deserving of the Editor's Choice award.

Likewise, the BenQ PE7700 and Sanyo PLV-Z3 both have 1,280 x 720 resolutions and good image quality.

The Sanyo had two sets of component video inputs and a sub-$500 replacement globe cost for 3,000 viewing hours in economy mode. The BenQ boasts BNC in addition to HDMI connectivity, and it's $200 cheaper than the Sanyo, making it the winner of the Highly Recommended award.

| BENQ PE7700 | NEC HT510G | MITSUBISHI HC900 | SONY VPLH550 | TOSHIBA MT200 | INFOCUS SP 5700 | |
|---|---|---|---|---|---|---|
| DLP | DLP | DLP | 3-LCD | DLP | DLP | Technology |
| 1,280 x 720 | 1,024 x 526 | 1,024 x 526 | 1,280 x 720 | 854 x 480 | 1,024 x 576 | Native resolution |
| 2,500 | 1,200 | 4,000 | 6,000 | 2,500 | 1,400 | Contrast ratio |
| 1,100 | 1,000 | 1,500 | 1,200 | 750 | 1,000 | Brightness (ANSI) |
| 2,000 hours (3,000 in eco) | 2,000 hours (3,000 in eco) | 2,000 hours (4,000 in eco) | 2,000 hours (3,000 in eco) | 2,000 hours (3,000 in eco) | 2,000 hours (3,000 in eco) | Bulb life |
| $620 | $500.50 | $649 | $599 | $690 | $599 | Bulb cost |
| 2 years | 2 years | 2 years | 1 year | 3 years | 2 years | Product warranty |
| Composite video; S-Video; HDMI; component; 5x RGB BNC | D-sub VGA input; S-Video; composite video/audio; component; 3.5mm mini jack | DVI input; D-sub VGA input; 3.5mm mini jack input; component video; S-Video; composite video/audio; L+R audio | USB; HDMI; component video; S-Video; composite video; D-sub VGA input | S-Video; composite video; component video; D-sub VGA input; DVI-D input | D-sub VGA input; 2x component video; composite video; 2x S-Video; DVI | Video connections |
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| Slight motion blur; high lamp costs. | Hard to read desktop; motion blur. | Hard to read desktop. | Black levels suffer with auto iris enabled. | Low resolution; image tearing present at times. | Expensive purchase cost. | ✖ |
| ★★★★☆ | ★★★☆☆ | ★★★½☆ | ★★★☆☆ | ★★★☆☆ | ★★★☆☆ | Verdict |



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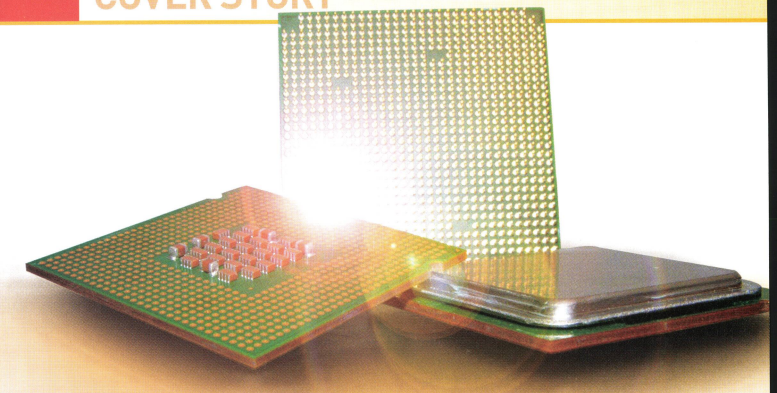
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# AMD vs Intel

## THE BATTLE FOR DESKTOP SUPREMACY

**_APC_ pitched the best of AMD against Intel to discover which brand's CPUs are the best for multimedia content creation, business computing and gaming. You'll be surprised at what _APC_ Labs' _John Gillooly_ and _Nick Race_ found.**

Watching two big IT companies slog it out is one of the industry's most popular spectator sports. While the weapons of choice are marketing budgets, legal documents and techno babble, enthusiasts can see the real competition occurring on the product level.

In the desktop CPU space, this skirmish has moved away from the PC and into the courtrooms, thanks to high-profile legal action started by AMD against Intel. AMD has alleged that Intel has used its market share to force its customers from buying AMD processors. While the case hadn't started at the time of writing, it will be the focus of the IT world when it eventually hits court.

But legal shenanigans have little to do with the merits of the processors these companies produce, which is a shame as the CPU market is as exciting as ever, thanks to two very different processor architectures. Ever since AMD launched its Athlon 64 the landscape has changed dramatically.

| VENDOR | MODEL | SOCKET | CORES | SPEED (GHz) | FSB/HT MHz | L1 CACHE | L2 CACHE |
|---|---|---|---|---|---|---|---|
| AMD | Athlon 64 4000+ | 939 | 1 | 2.4 | 2,000 | 12KB | 1MB |
| | Athlon X2 4800+ | 939 | 2 | 2.4 | 2,000 | 2 x 128KB | 2 x 1MB |
| | Athlon FX-57 | 939 | 1 | 2.8 | 2,000 | 128KB | 1MB |
| | Sempron 3300+ | 754 | 1 | 2 | 1,600 | 128KB | 256KB |
| Intel | Pentium 4 670 | 775 | 1 | 3.8 | 800 | 16KB | 2MB |
| | Pentium D 820 | 775 | 2 | 2.8 | 800 | 2 x 16KB | 2 x 1MB |
| | Pentium Extreme Edition | 775 | 2 | 3.2 | 800 | 2 x 16KB | 2 x 1MB |
| | Celeron D 351 | 775 | 1 | 3.2 | 533 | 16KB | 256KB |

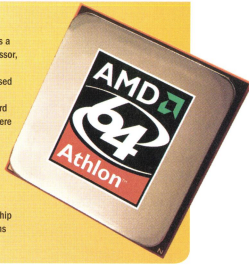
# In the green corner

AMD has four types of CPUs available for the desktop. At the budget end is the Sempron – a socket 754 Athlon 64-based part that differs from its faster brethren through smaller cache sizes and a slower 1,600MHz HyperTransport bus connection with the PC. Because the Sempron uses Socket 754 rather than the mainstream Socket 939 design, it doesn't currently have chipset support for PCI Express.

AMD's mainstream processor is the Athlon 64, available in Socket 939. This single-cored CPU features a 2,000MHz HyperTransport Bus and 1MB of L2 cache (some have smaller cache size). Its latest processor, the Athlon 64 X2, is a dual-core implementation of the normal Athlon 64. It uses the same 2,000MHz HT bus and each core has 1MB of L2 cache.

At the upper end of the performance scale, AMD has the Athlon 64 FX series of CPUs. Essentially a desktop branding of the Opteron server CPU, the Athlon 64 FX is the processor pitched at those wanting the fastest possible desktop performance. It uses a 2,000MHz HT bus and has 1MB of L2 cache. However, at any point in time the current FX model is clocked faster than the top-of-the-range Athlon 64.

The AMD's architecture includes a memory controller within the processor, which makes memory access a lot faster than using a Northbridge-based memory controller, even with the now ageing DDR400 as the standard memory type. It also means that there is little performance difference between motherboard chipsets, to the point that NVIDIA has abandoned the traditional Northbridge/Southbridge chipset design in favour of a single, feature-packed Southbridge-style chip called a Media and Communications Processor (MCP).




# In the blue corner




Like AMD, Intel currently has four streams of desktop processors available. At the budget end is the Celeron D. This processor runs on a 533MHz frontside bus (FSB) and has 256KB of L2 cache. It's available in the LGA775 package, which is now used top to bottom on Intel's processor range.

In the mainstream range are two processor types. The Pentium 4 600 series of CPUs is Intel's top single-core product, using an 800MHz FSB and sporting 2MB of L2 cache. The Pentium 4 600 CPUs also feature Hyper-Threading support.

These sit alongside Intel's dual-core Pentium D CPUs. Each Pentium D core has 1MB of cache and an 800MHz FSB. This is a pure dual-core offering with no Hyper-Threading support.

Sitting at the high end of the desktop range are the Pentium Extreme Edition CPUs. Based upon the Pentium D, these CPUs have dual-core and Hyper-Threading support, enabling four threads to be processed simultaneously. They run on an 800MHz FSB and feature 1MB of L2 cache per core.

All of these CPUs use Intel's pinless CPU design, called Land Grid Array (LGA), in which the CPU sits directly on motherboard-mounted pins, rather than plugging into a socket. Intel hasn't yet integrated a memory controller into its CPUs, which means the traditional Northbridge/Southbridge motherboard design is used for motherboards. The latest chipsets introduce support for DDR2-533 memory as Intel moves further away from using first-generation DDR400 RAM.

# The venue

There was a time when megahertz was king and it was easy to compare AMD and Intel CPU performance based upon clock speed. But when Intel launched the Pentium 4 processor architecture, this became less efficient on a clock-for-clock basis. Suddenly, AMD's Athlon CPU was outperforming Pentium 4 CPUs clocked 300MHz and higher.

This performance disparity continued to evolve, leading AMD to eventually make a move away from clock speed as its major CPU selling point. Instead, it launched its Performance Rating system, selling CPUs based upon model numbers rather than clock speeds. While these numbers were calculated on performance relative to AMD's old "Thunderbird"-cored Athlons, they approximated the speed of competing Intel processors.

It wasn't long before Intel bit the bullet and went down a similar model numbering path, exchanging clock speed for a numbering system based upon feature sets. This has left consumers with a slightly confusing series of incompatible selling points between the AMD and Intel offerings.

With that in mind, *APC* didn't select similarly clocked processors for testing, but obtained the top-of-the-range products in each category.

The AMD tests were carried out using an ASUS A8N-SLI Deluxe motherboard. Initially, an ASUS nForce4 SLI motherboard was going to be used for the Intel tests, but its chipset was unable to run Intel's dual-core Extreme Edition CPUs. An ASUS P5WD2 Premium motherboard, based upon the i955X chipset, was used instead.

The test bench consisted of 1GB of memory (DDR400 for AMD and DDR2-533 for Intel), a Western Digital Raptor SATA hard disk and a Gigabyte GeForce 7800GTX video card. The hard disk and video card were selected because they are the fastest products in their class, minimising bottlenecks and allowing for cleaner CPU benchmark results.

For the Sempron tests, a slightly different test bench was used due to its use of Socket 754. The test machine was based on an nForce3 motherboard, AGP Radeon 9800 card and 768MB of DDR400 (nForce3 boards only support three DIMM slots). For this reason the Sempron was omitted from gaming tests. However, its results from the other areas of testing are included.

# Multimedia comparison

Eight CPUs were put through a creative obstacle course to determine which one is better suited to load-intensive multimedia creation. With the growing popularity of digital video and still cameras, plus the recent release of consumer-level HD video equipment, more people are upgrading their PCs to cope with the processing power that editing applications demand.

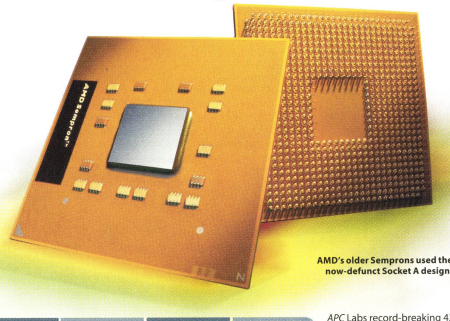
Historically, Intel has held the crown for multimedia number-crunching speed. As most tasks involving graphics, video or audio rendering tend to have large amounts of consistent data streaming through the CPU, the Pentium 4's long instruction pipeline pays off.

AMD suffers a little here by design — its short pipeline means the CPU constantly has to request new data via the HyperTransport link. This is fine for most types of computer usage, but it's not optimal for video rendering's extended data streaming.

A 530MB WAV audio file was encoded at 320Kbit/s using the LAME encoder, and AMD was the clear winner for this test. The Athlon FX-57 encoded the entire file in one minute and 28 seconds, compared to the Intel Extreme Edition 840's two minutes and 23 seconds. At the lower end, AMD's 4000+ and 4800+ both encoded in one minute and 42 seconds, while the Intel 670 and 820 managed two minutes and one second and two minutes and 39 seconds, respectively. The Celeron 351 encoded the file in two minutes and 27 seconds, while AMD's Sempron crawled in at three minutes and 29 seconds.

A heftier examination of CPU rendering was performed by using Windows Media Encoder 9 to encode a raw AVI file into a high-quality, 1,280 x 720 WMV file at 5Mbit/s variable bit rate. Intel's CPUs had the best overall results, with the three faster processors completing the task in under 20 minutes. The Extreme Edition managed a best score of 15 minutes and 37 seconds, while the Celeron's small Level 2 cache helped it finish in 28 minutes and 23 seconds.

The AMD processors didn't fare as well, though the X2 4800+ stole the show with a twelve minute and 42 second rendering time. The multithreaded nature of this benchmark showed the dramatic speed increase multi-cored processors can achieve, and the more efficient nature of the X2 stole the limelight from the Extreme Edition Intel chip in a traditionally weak performance area. The X2 was the only AMD CPU that completed the task in less than 20 minutes, with the Sempron taking a disappointing 29 minutes and 24 seconds.




**AMD's older Semprons used the now-defunct Socket A design.**

| MODEL | MULTIMEDIA WINSTONE (0–45) | MP3 ENCODING (MINUTES) (0–4) | WMV ENCODING (MINUTES) (0–30) |
|---|---|---|---|
| Athlon 64 | 38.9 | 1:42 | 23:59 |
| Athlon X2 | 39.1 | 1:42 | 12:42 |
| Athlon FX | 42.5 | 1:28 | 20:36 |
| Sempron 3300 | 29.8 | 3:29 | 29:24 |
| Pentium 4 | 33.9 | 2:01 | 19:42 |
| Pentium D | 28 | 2:39 | 16:59 |
| Pentium Extreme | 29.4 | 2:23 | 15:37 |
| Celeron D | 26 | 2:27 | 28:23 |

The Multimedia Content Creation Winstone 2004 benchmark gives a good overall impression of performance using common multimedia applications. It runs pre-scripted tasks in Adobe Premiere and Photoshop, Macromedia Director MX and Dreamweaver MX, Windows Media Encoder 9, NewTek LightWave 3D and Steinberg WaveLab. It keeps all the applications open at once and focuses heavily on CPU and system-intensive tasks.

The AMD processors outperformed the Intel camp across the board in the Multimedia Content Creation Winstone, with the three fastest AMD processors all posting scores over 35. The Athlon FX-57 chip managed the *APC* Labs record-breaking 42.5, demolishing the Intel Pentium 4 670's score of 33.9.

As the benchmark keeps all the applications open during the testing procedure, a slight increase in performance by multi-core processors was expected. True to form, the AMD Athlon X2 4800+ performed better than the similar speed, single-core 4000+. The Intel Celeron 351's limited L2 cache gave a poor showing, earning the chip a score of 26.

However, the more expensive dual-core Pentium D 820 didn't do much better, with a result of 28. Hyper-Threading propelled the Extreme Edition 840 to a slightly higher score of 29.4. Amazingly, AMD's budget part, the Sempron, outperformed Intel's premium Extreme Edition processor with a score of 29.8.

Overall results for multimedia between the AMD and Intel camps showed the AMD CPUs to be the strongest. Though Intel outclassed AMD in pure video encoding, thanks to an extended instruction pipeline, all other results point to AMD's chips being the choice for budding computer artists everywhere.

# CAD crunching

The largest segment of CPU sales go into business PCs. Sales to Original Equipment Manufacturers (OEMs) like Lenovo, HP and Acer account for over 70% of all CPUs sold. The majority of these end up in business desktop PCs, and as such, it would be remiss for Intel and AMD to ignore performance optimisations for this segment of the market.

Intel has had a larger share of the OEM market, a disparity that AMD is seeking to balance, with the thrust of AMD's recent complaint to a US Federal district court focusing on Intel's allegedly monopolistic dominance of this market.

The usage model for business computing is often less intense than gaming or multimedia. *APC* also incorporated 3D and production usage models under this category to include some more taxing benchmarks. These included CAD, 3D modelling and common Microsoft business applications including Word, Excel, Access, FrontPage and PowerPoint. Business applications were tested using Business Winstone 2004. OpenGL 3D was assessed with Cinebench (using the Cinema 4D engine), while general usage was examined using Futuremark's PCMark04 and PCMark05.

PCMark stresses the systems by using a range of short synthetic tests simulating XP startup, hard disk usage, file compression and encryption, physics and 3D, Web page rendering, video encoding and audio compression, virus scanning and memory benchmarking. Multithreading features heavily in parts of the test, and the multi-cored CPUs showed significant advantages in these areas.

AMD's X2 4800+ stole the show in the PCMark tests. With 6,951 in PCMark04 and 6,030 in PCMark05, it was the only chip to score over 6,000. The Intel Pentium Extreme Edition 840 placed a very close second with a score of 5,984 in PCMark05 and 6,228 in PCMark04.

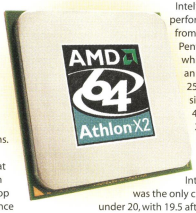
The AMD Athlon 64 4000+ performed very poorly, only achieving 4,787 in PCMark05 and 4,462 in PCMark04.

AMD's Sempron achieved the lowest scores in these benchmarks — 3,858 in PCMark04 and 3,127 in PCMark05 — due to its dated platform and slower memory controller. Intel's Celeron 351 fared better, earning a PCMark04 score of 4,181 and PCMark05 score of 3,989.

Business Winstone 2004 stresses systems with the use of more traditional office applications. It gives a good indication of what would be best on a business desktop from a performance perspective. Clearly, the AMD silicon reigned supreme in these tests. One CPU, the FX-57, scored over 30 — a rare occurrence in the *APC* Labs.

The relatively straightforward nature of business-oriented applications means no real performance increases could be seen with multiple CPUs. Both AMD and Intel multi-core models did not show any improvement over single-core, higher-frequency models.

The AMD Athlon FX-57 earned the top ranking in Business Winstone with a score of 31.4, while Intel's Extreme Edition only managed 22.8. Multi-core processors, the AMD X2 4800+ and Intel Pentium D 820, were a little behind the single-core leaders, with the AMD earning a 29.2 to the Pentium D's 21.8.




Intel's best performance was from the 3.8GHz Pentium 4 670, which managed an uninspiring 25.1. AMD's single-core 4000+ earned 27.7, while at the lower end, the Sempron achieved 22.3. Intel's Celeron was the only chip to score under 20, with 19.5 after all tests completed.

Cinebench was run to simulate 3D rendering normally found in CAD programs. It's a limited usage model for non-workstation CPUs such as Intel's Xeon and AMD's Opteron, but putting the chips under a heavy load with specific multithreaded components is a good way to let multi-cored CPUs set themselves apart from the single-core pack.

Cinebench's image rendering procedure initially runs the task using one core or CPU, then re-runs it using as many cores or CPUs available to it to calculate the speed increase gained from multi-cored rigs. Single-core tests set the megahertz powerhouses apart. The Athlon FX-57 showed the best single-thread result with 398, while Intel's Pentium 4 670 led the blue pack with 332. AMD's Athlon X4000+ managed second place with 342, while the Sempron and Celeron scored 282 and 247 respectively.

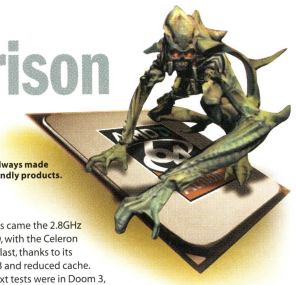
Dual-cored models completed the multithreaded test with some excellent results. The Athlon X2 4800+ took the honours with 639, while the Intel Extreme Edition earned second place with 609. The Pentium D 820 scored 465, and the Pentium 4 670's Hyper-Threaded second "CPU" reached 399.

In business desktop platforms, the AMD processors are faster across the board and also feature a lower thermal profile, meaning lower heat output, lower power bills and lower cooling costs. With the exception of the Sempron processor in PCMark testing, AMD's processors beat Intel's soundly in every test.

| MODEL | BUSINESS WINSTONE (0–40) | PCMARK04 (0–7000) | PCMARK05 (0–6100) | CINEBENCH SINGLE (0–400) | MULTIPLE (0–700) |
|---|---|---|---|---|---|
| Athlon 64 | 27.7 | 4787 | 6462 | 342 | NA |
| Athlon X2 | 29.2 | 6951 | 6030 | 340 | 639 |
| Athlon FX | 31.4 | 5546 | 4915 | 398 | NA |
| Sempron 3300 | 22.3 | 3858 | 3127 | 282 | NA |
| Pentium 4 | 25.1 | 5918 | 5092 | 332 | 399 |
| Pentium D | 21.8 | 5779 | 5229 | 248 | 465 |
| Pentium Extreme | 22.8 | 6228 | 5984 | 283 | 609 |
| Celeron D | 19.5 | 4181 | 3989 | 247 | NA |

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# Gaming comparison



AMD has always made gamer-friendly products.

While it isn't reflected in overall processor sales figures, gamers have had a soft spot for AMD's processors ever since it released the revered Thunderbird core for the original Athlon CPU.

Gamers weren't the biggest fans of Intel's Pentium 4 when it launched, preferring the Athlon for the reasons described above. But this changed when Intel launched what many consider the highpoint of the Pentium 4's history — the Northwood-cored CPU. Northwood delivered the things AMD fans loved about the Athlon Thunderbird, and since this levelled the playing field, both companies have had good success with gamers.

On paper, the current lineup of CPUs from both parties show varied gaming potential. No matter what the marketing materials say, dual-core processors are not gaming parts. There's no doubt that games will stress dual-core CPUs at some point down the track, but such a huge shift in mindset from single to multithreaded game development will take some time to achieve. And no-one can say when the first multithreaded PC games will emerge. For the foreseeable future, games will benefit most from single-core speed increases, rather than proliferating processor cores.

Take the 3DMark05 results as a prime example. This synthetic test produced results that closely match clock speeds. Fastest by a small margin was the Athlon 64 FX-57, scraping in 100 3DMarks faster than the Athlon 64 4000+ and Athlon 64 X2 4800+ with a score of 7,757. This can be credited to the 400MHz speed advantage that the 2.8GHz FX-57 has over the 2.4GHz cores used in the Athlon 64 4000+ and X2 4800+ (the second core in the 4800+ has no influence upon performance at all).

While the AMD processors were quickest in 3DMark05, Intel's CPUs showed virtually the same distribution. Fastest was Intel's 3.8GHz single-cored Pentium 4 670, which beat the gaming-focused 3.2GHz Pentium Extreme Edition 840 CPU by nearly 600 3DMarks. Behind this came the 2.8GHz Pentium D, with the Celeron D coming last, thanks to its slower FSB and reduced cache.

The next tests were in Doom 3, and the results mirror those under 3DMark05. Fastest was the Athlon 64 FX-57, followed by equal scores from the Athlon 64 4000+ and Athlon 64 X2 4800+. Behind these came the Pentium 4 670, again beating the Extreme Edition by a significant margin. Bringing up the rear were the Pentium D and, in last place, the Celeron.

The final batch were done using several Half-Life 2 benchmarks, and again the trend continued in all but one case. In the APCTest4 benchmark, the overall frame rate was limited by the video card performance. This means that the Athlon 64 FX-57, 64 4000+, 64 X2 4800+ and Pentium 4 670 all had virtually identical scores. Echoing the Doom 3 results, the Extreme Edition, Pentium D and Celeron D were the slowest performers.

As previously mentioned, the introduction of dual-core CPUs has done nothing to improve the games experience. In these tests, the dual-core processors delivered results that were dependant upon the clock speed of the core that was running the game. This is particularly evident when looking at the results of the equally clocked Athlon 64 4000+ and 64 X2 4800+. It also means that Intel's supposed flagship — the Hyper-Threaded Extreme Edition processor line — is grossly outperformed by the single-core Pentium 4 670. In fact, Intel's only break in the trend of performance = processor frequency is the Celeron D, which has a 3.2GHz clock speed hobbled by its 256KB of L2 cache and slower FSB.

You can see exactly why both companies abandoned the megahertz brandings and went for processor numbers. AMD's CPUs are much more efficient on a clock-for-clock basis than Intel's, with the 2.4GHz core of the 4000+ and 4800+ effortlessly outperforming the 3.8GHz Pentium 4 670.

This was a resounding win for AMD over Intel, with its flagship processors easily beating out the best Intel can throw at it. This may well change once multithreaded gaming titles hit the market, but both companies will be several generations along with their product cycles by then.



| MODEL | 3DMARK05 | DOOM III (FRAMES PER SECOND) | HALF-LIFE 2 TEST ONE (FPS) | HALF-LIFE 2 TEST TWO (FPS) | HALF-LIFE 2 TEST THREE (FPS) | HALF-LIFE 2 TEST FOUR (FPS) |
|---|---|---|---|---|---|---|
| | 0 8000 | 0 150 | 0 150 | 0 150 | 0 170 | 0 100 |
| Athlon 64 | 7,659 | 112.6 | 106.6 | 109.65 | 142.37 | 98 |
| Athlon X2 | 7,868 | 112.7 | 105.94 | 109.83 | 141.79 | 97.45 |
| Athlon FX | 7,757 | 120.8 | 118.03 | 124.04 | 163.04 | 98.19 |
| Sempron 3300 | NC | NC | NC | NC | NC | NC |
| Pentium 4 | 7,473 | 102.4 | 92.57 | 97.53 | 128.5 | 96.01 |
| Pentium D | 6,627 | 83.9 | 72.47 | 77.44 | 100.87 | 81.84 |
| Pentium Extreme | 6,874 | 91.1 | 75.28 | 82.21 | 103.85 | 86.15 |
| Celeron D | 6,137 | 61.7 | 54.1 | 59.56 | 77.88 | 60.84 |



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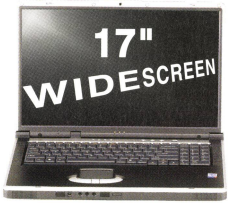
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# Cooking with silicon

A major complaint about the current CPUs is the massive thermal profile, or the amount of wasted heat that has to be removed to keep the chip from cooking itself. Intel CPUs are notorious for the amount of wasted heat they generate and AMD's chips aren't far behind.

A CPU's thermal profile, and thus validation for coolers that can cope with the amount of heat they need to remove, is known in Intel's nomenclature as its Thermal Design Power (TDP).

PCs, components and even Intel's new BTX form factor are built around removing heat from CPUs, and the TDP is a measure of just how much heat needs to be removed. Currently the "hottest" (literally) processor on the shelf is Intel's Pentium Extreme Edition 840.

This dual-core 3.2GHz beastie puts out 130W of thermal power under load, a dramatic amount of heat that needs to be quickly removed from the CPU to keep it stable.

While AMD come off as the good guys in this situation, it's not really justified. The new Athlon X2 4800+ is rated at 110W, close to the Pentium 4 670's gigantic heat output of 115W.

*APC*'s Lab team put their heads together to see if they could put the heat to good use.

After a particularly licentious evening at an awards ceremony, a round of bacon and egg sandwiches was required to settle rolling stomachs.

In desperation, a nice, solid copper Thermaltake cooler was acquired and its fins were cut down to fashion a flat surface. An aluminium holder was manufactured and sealed, and some thermal epoxy brought the two parts together.

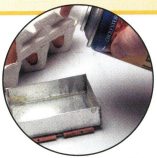
Eggs, cooking spray and a loaf of bread were purchased, and a new technological marvel was born — the CPU egg sandwich. A test bench was set up with a particularly hot Intel Pentium 4 670 firmly embedded in its socket. A quick dab of thermal paste and a firm press down mated the egg cooker with the top of the CPU.

An egg was cracked into the cooker, the power switch was flicked and in no time the scent of frying eggs was wafting through the air. Unfortunately, protective measures shut down the system before the egg was cooked through — it seems an egg can't cool a CPU sufficiently to stop thermal protection procedures from kicking in.

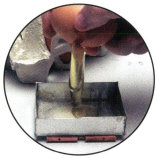
Waiting a few minutes for the contraption to cool enough to let the system boot, the egg was given another blast. For the next 20 minutes, the protesting motherboard applied cooking power to the egg.

In the name of science, the test was repeated using the same cooler/cooker on an AMD platform — no discernable difference in the amount of time it took to cook the egg was noticed. It was still a long wait for an egg sandwich, but too short considering it was a CPU acting as a hotplate.

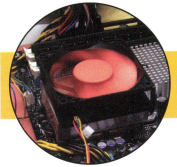
The eggs were inserted between two slices of white bread, tomato sauce applied and voila! Computer eggs, *APC* style.



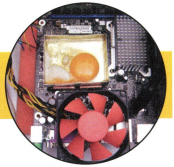
**Some cooking spray is applied to stop the egg from sticking.**



**One hot egg, coming right up!**



**A fan was placed on top of the egg rig to clear waste heat.**

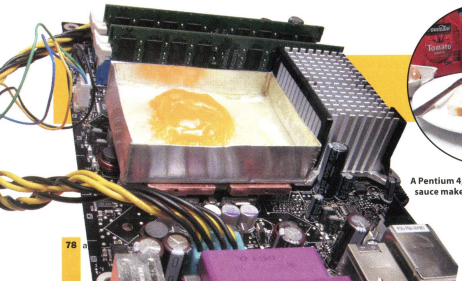


**Bubbling up nicely, this one will be ready in no time.**

| MODEL | WATTS (0 – 150) |
|---|---|
| Athlon 64 | 89 |
| Athlon X2 | 110 |
| Athlon FX | 104 |
| Sempron 3300 | 62 |
| Pentium 4 | 115 |
| Pentium D | 95 |
| Pentium Extreme | 130 |
| Celeron D | 84 |



**The cooking starts slow, but gets right up there.**





**A Pentium 4, some bread and tomato sauce makes a complete breakfast.**



**A haggard-looking *APC* staffer tucks in.**

# In conclusion

Gauging processor performance was once a simple game of compare the clock speeds. But ever since AMD launched its Athlon and Intel its Pentium 4 there's been continuing divergence in the way the competing processors work. The test results show this is a continuing trend, with the differing processor architectures demonstrating strengths and weaknesses in many areas.

It was made evident that the clear victor was AMD's Athlon 64 series of processors. In the majority of benchmarks, the Athlon 64 FX-57, 4000+ and X2 4800+ thrashed Intel's competing Extreme Edition, Pentium 4 and Pentium D offerings.

In the budget space, the Celeron D edged out the Sempron, though this is most likely a side effect of the Sempron's older socket design and hence older supporting hardware. But beyond the direct AMD versus Intel comparison, the testing gave an insight into the levels of performance delivered, depending upon your usage model.

While gaming is a very processor hungry activity, it's also a very traditional type of computing. Games are single-threaded applications and they generally aren't the sort of programs run in a multitasked environment like desktop applications. When a game is running, the processor has a single major focus, which produces results that are more dependant upon single processor core speed rather than feature sets or multiprocessors. There's no doubt that games will migrate to multithreaded design faster than any other software area. However, the timeframe for the move to occur on any significant level is still unknown.

On the other hand, multimedia works in a very different way to gaming. Creating sound or video usually requires you to work across a variety of open programs rather than focusing on a single, full-screen application.

The benchmarks employed in *APC*'s multimedia tests reflected this by switching between open single-threaded applications in a replication of the content creation process. This differed from the gaming test results, as dual-core CPUs show small performance advantages over single cores, thanks to the processing overhead inherent in keeping multiple applications alive. While the improvements may be small in terms of benchmark numbers, the user experience was a much smoother one than those experienced with a single-core processor.

> AMD'S ATHLON 64S WERE THE CLEAR VICTORS

Benchmarks like PCMark05 show how dual-core processors shine when simultaneous applications are run. Rather than running single applications that can utilise multiple threads (like Cinebench), PCMark05 runs several applications at the same time. This is a simple as encoding an audio file while virus scanning, but it's an accurate replication of the kind of load put on a system by heavy desktop users.

That said, even the lowly Celeron D can handle productivity applications well and is much more likely to end up in business desktops than any of the highest-performing enthusiast CPUs.

While the egg-cooking experiment may have sounded frivolous, it effectively demonstrated the sheer amount of heat these processors output. Throughout the tests, a close eye was kept on the thermal performance of the Intel processors. The company includes technology inside its processors that automatically underclocks its CPUs when they begin to overheat. This throttling means that an overheating PC is unlikely to crash, though a dip in performance will be very noticeable in CPU-intensive tasks like games.

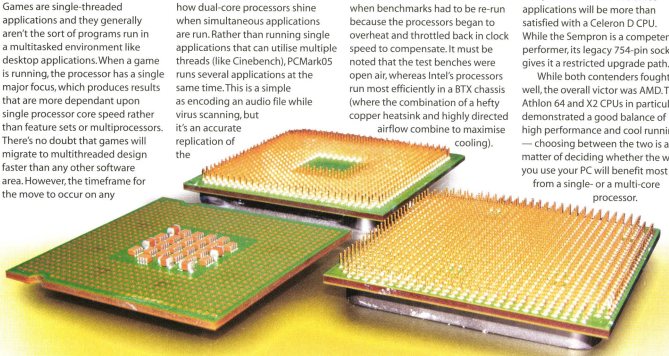
There were a few occasions when benchmarks had to be re-run because the processors began to overheat and throttled back in clock speed to compensate. It must be noted that the test benches were open air, whereas Intel's processors run most efficiently in a BTX chassis (where the combination of a hefty copper heatsink and highly directed airflow combine to maximise cooling).

Thermal output is an important factor to consider, and those wanting to strap a CPU into a small form factor PC are advised to carefully check the cooling potential of the system. It is also a concern for those running PCs over the hot Australian summer, where the ambient temperature is likely to push the processor and cause performance reductions similar to those that *APC* experienced in the Labs testing.

Now more than ever the choice of CPU depends upon what you want to do with it. Generally, those who use multithreaded applications or like to have multiple applications running at the same time should opt for a dual-core CPU. If gaming is your forte then a fast, single-cored processor is your best bet — take that money you save by not buying an enthusiast-class Extreme Edition or FX processor and spend it on a high-end video card for a much more noticeable boost in performance.

Those who don't have any hefty applications to throw at their PCs and are just happy to surf the Web, send email and use office applications will be more than satisfied with a Celeron D CPU. While the Sempron is a competent performer, its legacy 754-pin socket gives it a restricted upgrade path.

While both contenders fought well, the overall victor was AMD. The Athlon 64 and X2 CPUs in particular demonstrated a good balance of high performance and cool running — choosing between the two is a matter of deciding whether the way you use your PC will benefit most from a single- or a multi-core processor.



# Op...Opteron and away!

***Simon Sharwood* explains how AMD Opterons and Intel Xeons are proving their worth by making it possible to plan space missions in two weeks instead of three years.**

Gravity is no laughing matter at the University of Queensland's Centre for Hypersonics, a facility where high-speed wind tunnels are used to simulate the effects of very high-speed travel on aircraft and spacecraft.

The work is important because all sorts of odd things happen at high speeds. The Centre's work on scramjets that travel at Mach 5 revealed that the heat the flying machines create can cause gases to react with each other in potentially dangerous ways that could disrupt an aircraft's flight.

The problems are even tougher for spacecrafts, which must carry fuel to propel themselves through space, and then more fuel to slow them down at their destinations. Yet every gram of fuel a space probe carries for braking is a gram that can't be dedicated to instruments that tell us more about the solar system.

To avoid this waste in the future, scientists wonder if spacecraft could decelerate by glancing off Titan's nitrogen and methane atmosphere instead of by firing retrorockets. By using the atmosphere as a brake, scientists hope future crafts will carry less fuel and larger payloads. The Centre is one of the few facilities on Earth capable of studying just what happens when a spacecraft travelling at 10km/s hits Titan's atmosphere.

"You can't redesign a spacecraft when you get there," says Dr. Peter Jacobs, a lecturer in mechanical engineering at the University of Queensland who studies at the Centre. "You only get one chance, and after six years of travel to get there, that's over in a few seconds."

And if the numbers are wrong, all you'll have to show for your efforts is a small addition to Titan's atmosphere after your probe vaporises on impact.

The obvious answer is to simulate the encounter, but doing so is a computational task of extraordinary enormity. At 10km/s, a space probe's impact with Titan's atmosphere could turn its methane into cyanide gas, a far more radioactive substance that would mean the probe needs extra shielding.

"We need to consider speed, temperature and pressure, and then put it all together into one model to get the bigger picture. We break the spacecraft into hundreds of thousands of little 'cells' to see how the properties of the gas and the ship changes," Jacobs explains.

A single simulation of this sort required 11,500 CPU hours — 480 days of non-stop processing — for a conventional desktop machine, a timeframe at which getting a spacecraft just right would be a lifetime's work.

The obvious answer would be to use a supercomputer to solve the problem. However, getting access to such a behemoth is not easy. The Centre for Hypersonics therefore teamed with the University's Centre for Computational Molecular Science to install a clutch of Opteron 250 CPUs to tackle the task. The CPUs run at 2.4GHz and are installed in pairs inside Sun Fire V20z servers that each pack 4GB of RAM and live in a two-rack, 66-node Sun Grid System. The Centre also runs another grid with 32 nodes packed into two Intel Xeon processors.

In both cases, Sun's gridware does the job of shunting bits between the Linux-powered boxes to share the computing load between the processors. Yet their raw power has reduced the compute time required to simulate a space braking manoeuvre from three years to 10 days.

Professor and director of the Centre for Hypersonics, Richard Morgan, says this time reduction has significantly impacted the Centre's work. "Previously, we could only run a very few sample test conditions because it just took so long to run the computer. Now each time we look at a new condition, it's not really a problem. We can now run a computer simulation in tandem with the experiment. Before, we'd have to do limited simulations in restricted areas of research. Now there's no limit to what we can do; we've greatly expanded the regions of the flow that we can properly analyse and this has added real value to our experiments."

Colleagues at the Centre for Computational Molecular Science are also chuffed by the performance of the Opteron-based grid.

"Improvement in our research all hinges on throughput," says the Centre's director Sean Smith. "The power of 64-bit processors has developed to the stage that on one Sun dual-processor node you have enough memory and disk space — and a fast enough processor — to handle about 90% of our calculations. There is some small fraction for which we do need large shared-memory systems, but there's no question that most of our calculations are of the magnitude that will run through quite nicely on one of these nodes."

The shared system also has the advantage of being rack-mounted, a more-than-useful configuration that simply occupies less space and consumes less power than a supercomputer, even if it requires a reasonably hefty amount of air conditioning to cope with the heat generated by 66 servers. The price of the new system was another bonus. The pair now plans a new 90-node Opteron farm to tackle even tougher problems.

Yet even with this new clutch of computers about to enter the building, Jacobs still recognises that this kind of rig has its limitations. "I'd really love a Cray supercomputer," he says. "But I know we simply can't afford them. Grids and commodity CPUs let us do the same job. I'm not willing to wait three years for results, but I am willing to wait 10 days." apc



A scramjet from the renowned research conducted by the Centre for Hypersonic Research at the University of Queensland.

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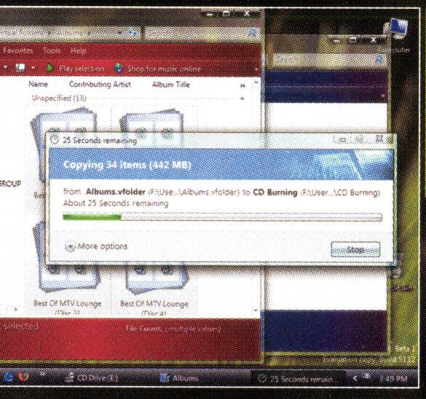
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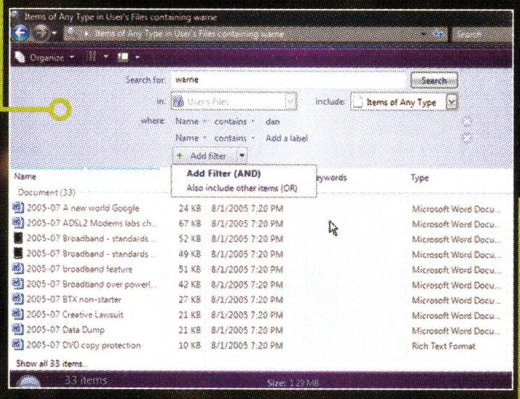
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# Windows Vista

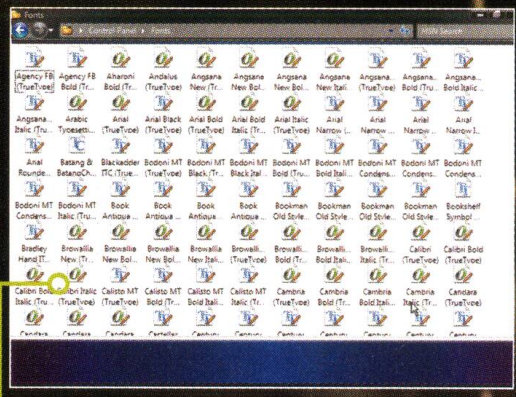
**next generation of the Windows operating system is finally out in beta. Dubbed Windows Vista eta 1 after a long gestation under the "Longhorn" codename, the newest version of Windows atures many changes that *APC* has highlighted in this overview of the OS. For a highly detailed pictorial run-through, there are 500 screen shots on this month's cover DVD.**



ple GUI elements get decoration and gloss The green progress bar pulses like plasma down a tube.



New toolbar options include an Organise menu, which has common tasks like renaming, moving, copying, emailing or deleting files.



Some things never change, and Microsoft hasn't improved font management in Vista compared to. . . say, uh, Windows 3.1.

# Vista's virtual folders

**It might look similar to XP, but delving into Vista's document folders shows a very different beast.**

oft has taken a leaf out of book, directly enting many of the eatures from Apple's te (iPhoto and iTunes) Windows Explorer. example, open the s folder and you can otos grouped by date eyword, star rating or etadata. can navigate your music as a list with iTunes-like ion or as folders that are grouped by genre, artist, album and song.

Quite simply, Microsoft is slowly doing away with the concept of manually organising your files and instead using Vista's inbuilt search engine to create (and transparently update) Virtual Folders on-the-fly.

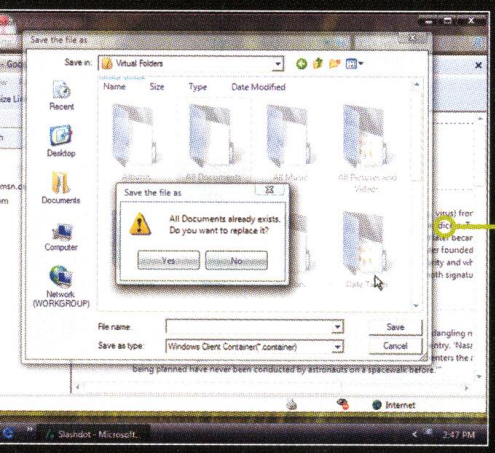
The implications of Virtual Folders are that you can keep your data organised any way you want. Files can exist within multiple folders (author and keyword, for example), but the thing to bear in mind is that they don't exist physically within the virtual folder.

In Vista Beta 1, this is quite confusing, as you can't copy files into a virtual folder — and Windows doesn't give an error message to explain why. This will certainly be improved in the shipping version as it currently poses a major useability barrier.

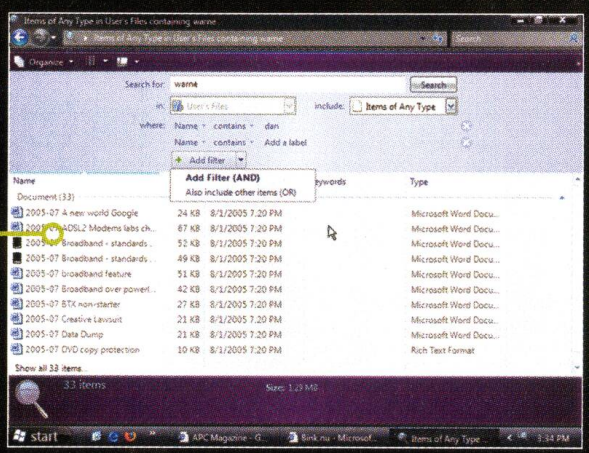
Microsoft has dropped the condescending "My" prefix to folders, so folders are just called Documents, Pictures, and so on. These folders have a slightly different back-end mapping — in XP they map to a user-specific structure under C:\Documents and Settings; in Vista they map to C:\Users, again with user-specific subfolders.

There's also a Linux-style C:\Users\Public folder, the Vista equivalent of C:\Documents and Settings\All Users.

*James Bannan and Dan Warne*

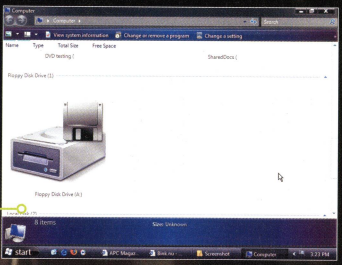


There are some huge bugs in Vista Beta 1 — if you try to save a file into a Virtual Folder (which you shouldn't really try to do anyway), Windows asks if you'd like to replace the Virtual Folder definition with the file. Um, no.

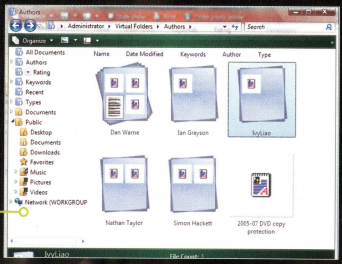


You can create your own Virtual Folders by simply doing a search. Specify and customise your search criteria, perform the search and then save the query. Like the other folders, this new one will be dynamically updated when new content matching the search criteria is created.

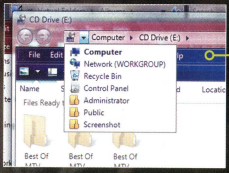


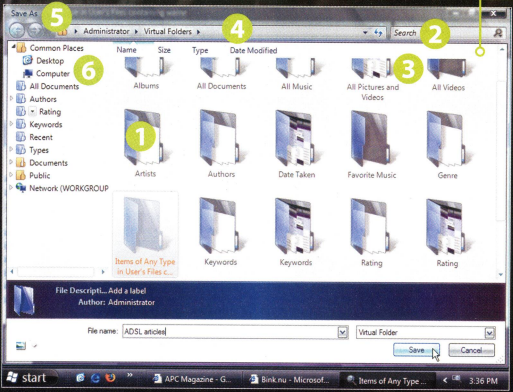
**Vista can support *big* monitors. Its icons can scale to an incredibly large size without pixellation. Ultimately, if developers add document previews of this resolution to files, it may not be necessary to even open a file to see what's inside it.**



**Vista can group documents in Windows Explorer based on metadata such as the author.**



**The Explorer Address bar has been given a major revamp. Instead of showing your current location within the hierarchical file structure, Vista shows your location in a timeline-styled format — a history of your travels so to speak. Each step you've taken to get where you are is shown. But at each level, there's an arrow that links to the file structure at that level and allows you to jump to any location — which could be three steps back.**



**1 Virtual Folders: can find files on your computer instantly based on the search criteria you define.**

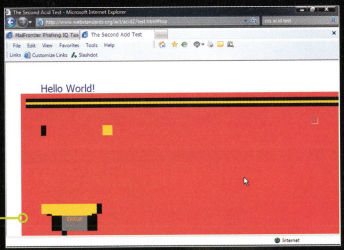
**2 Search: quickly finds files using the file search box at the top right corner of every Explorer window.**

**3 Eye candy icons: everything is glossy and high-resolution in Vista. Jaggies are banished — except on old application icons.**

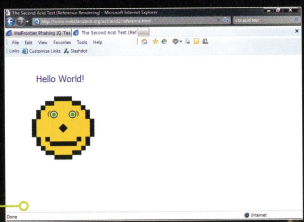
**4 New path: jump back two or three folders with one click using Vista's visual path.**

**5 Browser buttons: there's no Up button for directory browsing anymore, just Web browser-styled back and forward.**

**6 Places: more extensive lists of common places for files but potentially more confusing for novice users too.**




IE7 still doesn't handle the Cascading Style Sheets Acid Test 2, designed to show up browsers that don't properly support Web standards. Microsoft says it's working to improve this by the time Vista ships but concedes it won't be fully resolved in the final version.




How Acid Test 2 is supposed to look if your browser properly supports Web standards.

# Internet Explorer 7

## It's a little bit underwhelming but at least it has tabs. . .

**Microsoft's implementation of tabbed browsing is actually pretty funky. There's a useful tab button to the right of any open tabs that opens up a new one straight away.**

**It's not radically different from any other tabbed browser, but Microsoft's implementation is surprisingly clean considering tabbed browsing can sometimes confuse users who have never used it before.**

**Of course, it *does* mean that you don't have to download Firefox just to get a tabbed browsing experience.**

**Real Simple Syndication (RSS) feeds are now also supported. When you load a site that has RSS available, IE7 discovers the feed and a little red communications icon lights up. You can subscribe then and there, add it your Favorites and view the feed.**

**Beta 1's feed viewing is barebones, but Microsoft has already shown screenshots of it working more like Apple's Safari browser with article search and so on. In the final build of Vista, RSS functionality is planned to be built-in at the operating system level, so that applications other than IE can use RSS content.**

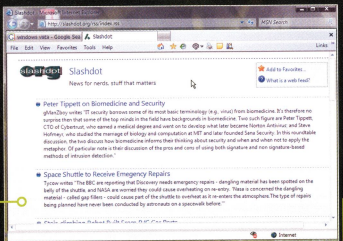
**One new feature that will have users celebrating is the Print-To-Fit function. When you print a Web page, IE formats it to fit properly on the page. No more printing sheets of paper containing individual frames and banners.**

**From a security perspective, IE7 uses a 256-bit security cipher and an add-in called the Phishing Filter, which is designed to prevent phishing attacks from stealing users' personal details.**

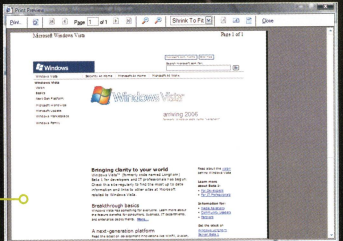
**A beta of IE7 for Windows XP has also been released to Microsoft developers through the MSDN network.**

**It's not a public beta, but it has already been illegally leaked to P2P networks.**

***James Bannan and Dan Warne***




Viewing RSS feeds in IE7 beta is rather plain at the moment, but Microsoft has previously shown screenshots with a utility panel down the right-hand side of the screen that allows searching by article, filtering by date and selecting article length. Much like Apple Safari 2.0.




Yes, that's printing as it's supposed to be. IE7 can actually fit Web pages as they're displayed onscreen onto A4 paper, rather than chopping off text on the right-hand side, printing banners on separate pages, and so on.







**1 Tabs:** Vista shrinks and expands them depending on how many there are. If you only have one or two, they can be huge.

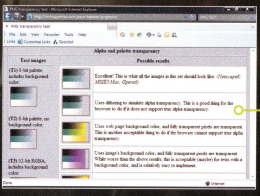
**2 New tab:** easy for new users to pick up — you just have to click the small blank tab to get a new one.

**3 RSS feeds:** this little icon lights up when there's an RSS newsfeed available. Click it to view or subscribe to the feed.

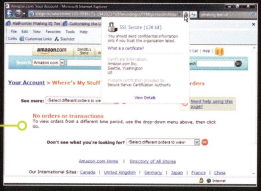
**4 Toolbar:** has been simplified. The clutter has been cut dramatically and Back/Forward buttons have been isolated.

**5 Search:** an in-browser search box that includes the most popular search engines (including Google).

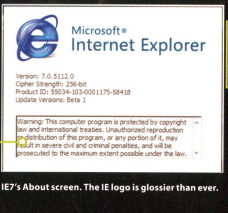
**6 Ship date:** arriving in 2006 — if Microsoft says so on the Vista Web page, it must be true.




**IE7 finally supports real graphic transparency, as demonstrated on the transparent PNG test page. Finally, Web design is brought into the 20th century (let alone into the 21st).**



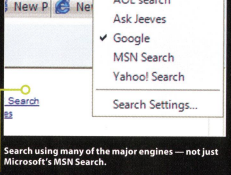

**If you're sceptical about the security of a site you're visiting, click on the padlock to get details of the encryption being used.**




**IE7's About screen. The IE logo is glossier than ever.**

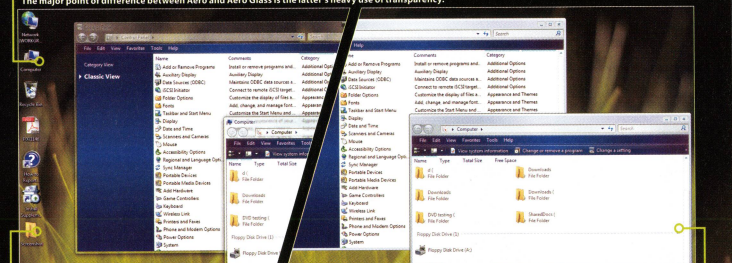



**IE7's RSS feed menu in action.**




**Search using many of the major engines — not just Microsoft's MSN Search.**

The major point of difference between Aero and Aero Glass is the latter's heavy use of transparency.



When multiple windows are stacked together, the translucent areas of the Aero Glass interface blur the content underneath. This gives the desktop a greater sense of depth.

The standard Aero theme still gives the illusion of depth, thanks to the pseudo-3D window shading and extensive use of drop shadows.

# Glass GUI

## Users are given a choice of fancy translucent desktop graphics, but it can be a bit confusing.

**One of the most hyped, and least seen, parts of Windows Vista during its development has been the revamped Aero user interface. Previously omitted from released builds of Vista, it makes its debut in Beta 1.**

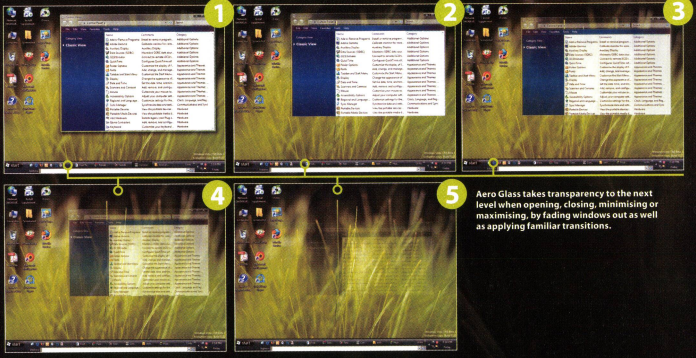
**Aero comes in two flavours that are auto-selected depending upon graphics hardware. For DirectX 9-level video hardware, Vista defaults to the Aero Glass interface — a transparency-heavy revamp of the basic window design.**

**The Aero Glass effect turns window borders, title bars, navigation bars and buttons a translucent grey. When windows overlap, this translucency stacks to give a greater sense of depth. This can become confusing, especially if you are the type who opens 15 different windows at once. For those without the necessary DirectX 9 graphics hardware, Vista defaults to the basic Aero interface. This is essentially the same theme with the translucency removed, giving the borders, bars and buttons a solid, grey metal look.**

**You can enable software rendering of Aero Glass on unsupported hardware using a program called TweakVista (see page 88). However, the desktop environment will slow to a crawl when it's enabled.**

**Those who still can't see the need for fancy desktop graphics are also catered for, with those who hunger for the look of Windows 2000 sated by the continued presence of the Windows Classic theme.**

***James Bannan and John Gillooly***




**Aero Glass takes transparency to the next level when opening, closing, minimising or maximising, by fading windows out as well as applying familiar transitions.**

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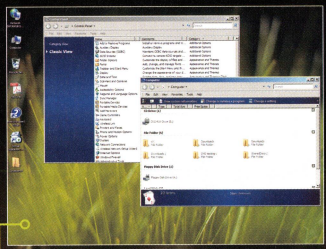



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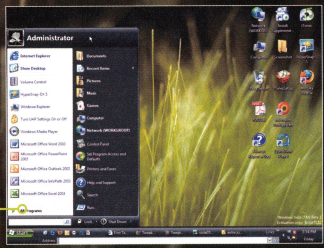
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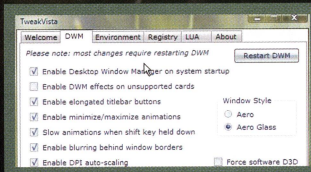


For those who don't want the new eye candy, the familiar classic theme is only a few clicks away.



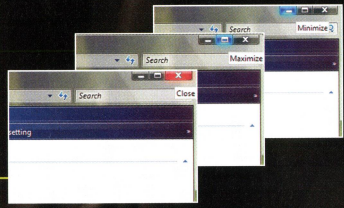

Two major parts of Windows Vista that haven't been glassed are the Start Menu and Cursor.

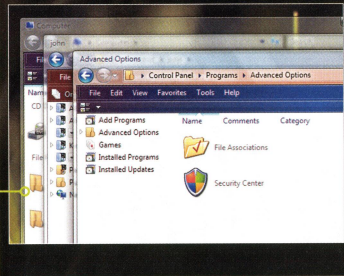
## Tweak Vista www.tweakvista.com

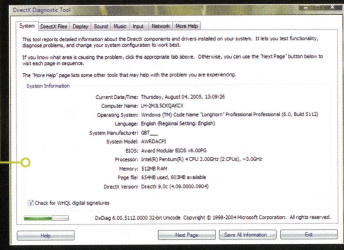


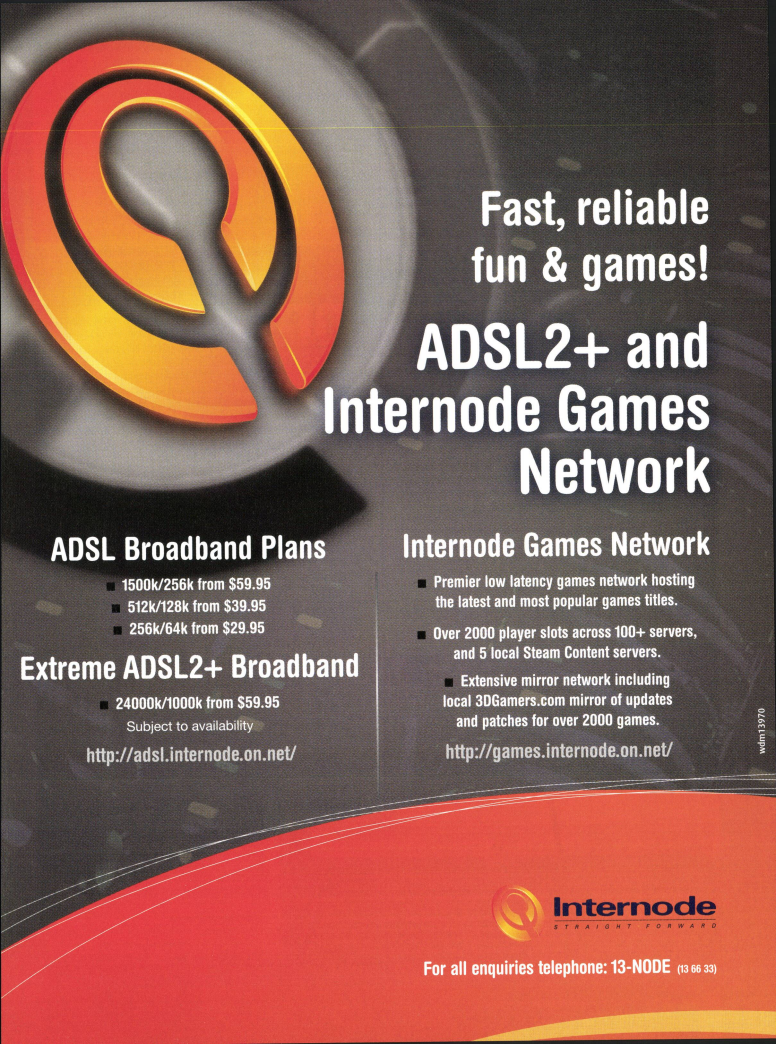

Windows Vista automatically selects Aero or Aero Glass depending upon your graphics hardware. If the system doesn't have the appropriate LDDM drivers for Vista (NVIDIA and ATI have released drivers for the beta), you can use a tool like TweakVista to force Aero Glass to be enabled. It can also force CPU-based software rendering of the Aero Glass interface.

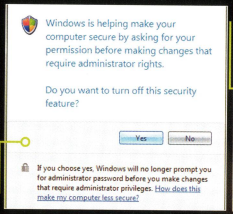
When mousing over the minimise, maximise and exit buttons at the top of a window, the Aero Glass interface automatically highlights the active button. This immediate visual feedback is apparent throughout the Glass interface.



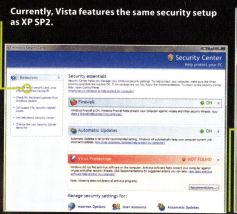



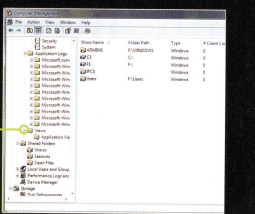

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Vista's User Account Protection makes administration access more Linux-like.

Currently, Vista features the same security setup as XP SP2.



Yet again, root directories get shared by default.

# Under the bonnet

## Although it comes with disappointments, the security updates aren't too bad.

**Every new release of Windows attempts to close the security holes of the previous version (with varied success).**

**Vista follows the same path, but instead of being built upon the enhanced security features of XP SP2, it's actually built on Windows 2003 SP1, which incorporated a stack of low-level platform security.**

**That said, the XP SP2 features of Windows Firewall and the Security Center are still present, and they're as pervasive as ever. One of Vista's best new security features is User Account Protection (UAP). This follows the Linux example, where users with administrative permissions over the system still function with minimal privileges.**

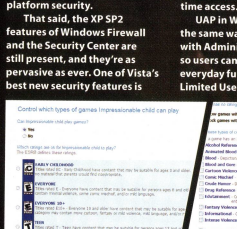
**If anything needs to be done requiring full system access, the user is prompted for the system password, which grants one-time access.**

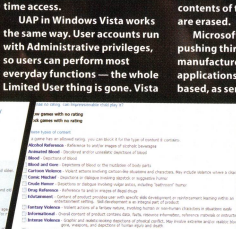
**UAP in Windows Vista works the same way. User accounts run with Administrative privileges, so users can perform most everyday functions — the whole Limited User thing is gone. Vista makes use of a user-specific feature called Virtual Store. When a user is logged in and performs an action that requires access to restricted areas of the file system or registry, Vista redirects the disk write to C:\Virtual Store, rather than actually modifying the system. Once the user logs off, the contents of the Virtual Store are erased.**

**Microsoft is also apparently pushing third party manufacturers to make their applications more service-based, as services interact with the system at a lower level, and are independent of user permissions. This, combined with Windows Service Hardening (which limits what services are able to access), should result in fewer holes for malicious outsiders to exploit — or users to unwittingly create.**

**One disappointing thing that *APC* encountered during testing was the fact that root directories are still made into hidden shares by default — a longstanding security concern with Windows.**

***James Bannan and John Gillooly***

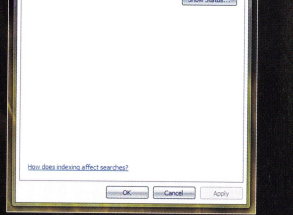


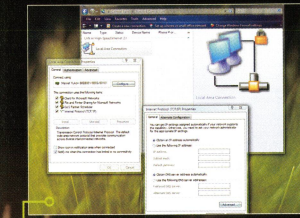




**Parental Controls:** **Windows Vista also includes a robust system for restricting access to mature content in games. Using a system based upon the US ESRB ratings system, parents can restrict access to games based upon rating level and specific types of content, or manually block specific game titles.**

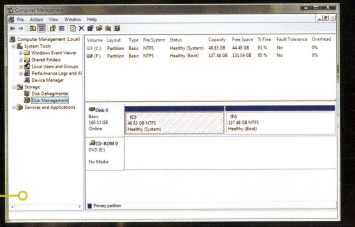
**Under testing, the Parental Controls even managed to block games that were copied to the PC and run, rather than installed normally. The only concern here is the different rating systems used in the US and Australia, and whether release versions of Windows Vista will incorporate an Office of Film and Literature Classification-based means of restricting access to games.**

**With the heavy use of Virtual Folders in Vista, indexing and searching is crucial. At the moment the configuration options are lacking, hopefully more flexibility will be built into the controls for this tool once Beta 2 is released.**





**Networking:** Very few changes have been made to the networking control panels and configuration, although under the bonnet, there have been several modifications, including a move from IPV4 to IPV6. The wireless networking wizards used in Windows XP Service Pack 2 are included, which greatly simplify the set up of home networks.



# For Administrators

Administrative tools within Windows Vista haven't changed from Windows XP. However, more fundamental changes have been made in order to ease the administration of the operating system.

Deploying Vista as an Standard Operating Environment is designed to be much less of a headache. The structure of the build media has been redesigned, so instead of the Vista DVD containing loads of small files — applications, CABs and drivers — which need to be copied locally, it's comprised of loads of snapshot images (similar to Symantec Ghost). This reduces the installation time as well as the need for user input.

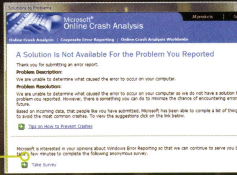
In the final release, there will also be tools for assisting administrators to mount and modify the installation images on-the-fly, which will help with slipstreaming patches and service packs into the original media.

The UAP facility will also be a great help — one of the problems with maintaining a Windows-based SOE is striking the right balance between restrictions and functionality.

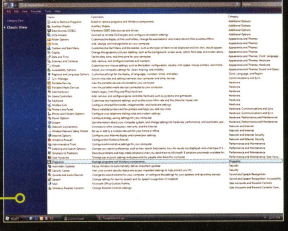
More intelligent user permissions should greatly reduce application errors as well as the need to increase user rights to get an application to function.

And surprisingly, Virtual Folders are pretty exciting for network admins. Instead of mucking around with drive mappings on login, administrators can customise search scripts relevant to particular groups or departments, and distribute them as Virtual Folders.

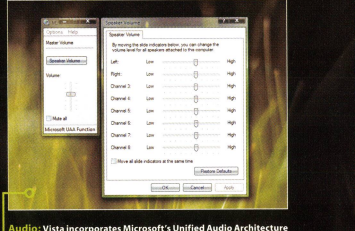
It doesn't actually matter where the files are, as long as users can see them. This means they can sit on the company file server, but users can interact with them like local files.



**Problems:** When Windows Vista suffers the inevitable crash (which was refreshingly rare in *APC*'s tests of Beta 1), it gives you the option of not only sending crash information to Microsoft but also to open the "Solution Centre" to see if a fix exists. It's not very helpful at the moment, but it's something *APC* will watch closely as Windows Vista approaches launch.



**Control Panel:** While Beta 1's Control Panel hasn't changed much, there are some new additions and very useful revamps of existing features.



**Audio:** Vista incorporates Microsoft's Unified Audio Architecture and features better controls for non-stereo audio setups. During tests, the volume for eight channels of audio could be independently adjusted.



# Room to move

**Companies and boffins are racing to provide storage alternatives to the world. *David Braue* explains what the future has in store.**

Hard drive getting a bit cramped? Sick of swapping DVD-Rs to back up your expanding collection of MP3s and ripped movies? Fred Thomas feels your pain. As chief technologist within storage specialist Iomega's Advanced Technology Group, Thomas' job is to think small — very small. And it has paid off. This year, Thomas is doing the conference circuit discussing the way he plans to cram 300GB of data onto a CD-sized platter within the next few years.

By comparison, Blu-ray and HD-DVDs store just 50GB and 25GB respectively. Thomas' technique also uses blue lasers but shapes the beam using "subwavelength gradings" — features on the disc that are infinitesimally smaller than the 405 nanometre wide laser used to read them.

Each pit on a Blu-ray disc stores one bit and reflects the laser straight back. In Thomas' design, the subwavelength gradings measure 100nm in diameter and may be slightly angled, subtly polarising and reflecting the light. The net effect is that four bits of information can be stored in the same space as one bit. Reduce the grading to 50nm and density jumps to eight times that of Blu-ray.

"With these subwavelength gradings, you move into the realm of quantum optics," says Thomas, who has worked with researchers at the University of Arizona and nanotechnology manufacturer NanoOptical Corporation to validate his invention. "Strange changes to the properties of light can be done. If you put a slight slope on the tips of these nanogradings, you can control the orientation of the reflection."

He adds that in theory, the subwavelength gradings can be rotated through 180° in increments of 0.5° — offering significant room to grow in the future.

## UPSTART IN A BLOWOUT

It may sound like obscure geekspeak, but polarisation, subwavelength gradings and the many other vagaries of optical physics are the only chance to avert a storage train wreck — data consumption is increasing faster than our ability to store it.

High-definition digital TV uses around 13GB of storage per hour of video. Your average TV network would therefore require 2.2TB per 168 hour week of broadcasting — and that's just for the finished product. Factor in space for raw video footage and editing, and it's easy to see why even Blu-ray is a little more than a pinkie stuck into an exploding dike.

With new laws requiring large companies to store every piece of information they send or receive, too much storage still isn't enough. Five years ago, having 1TB of storage seemed excessive for most companies, but it's now par for the course and the biggest companies are installing — and regularly backing up — dozens of terabytes of data. Industry analyst IDC reckons Asia-Pacific businesses alone bought 76,350TB (76.4 petabytes) of disk space in 2004, up 65.1% from 2003.

There are no signs of the demand stopping. In the first quarter of 2005 alone, 409PB of disk was sold and growth continues to push 60% per year. Where is all that data going to be backed up? Tape, with capacities now pushing 400GB per cartridge, has so far been the only way to keep up. Even Blu-ray or its enterprise-class cousin Ultra Density Optical (UDO) look like long shots to change that.

Sony has squeezed 200GB onto an eight-layer Blu-ray disc, but mass production is still well down the track. Besides, many consider 200GB as the technological limit for Blu-ray, since the complexity rises sharply as more layers are added.

The next milestone for optical storage is the 1TB disc, and boffins around the world are doing their best to get there. This time around, however, the old tricks won't work. The reason is because optical storage depends on the ability to reliably burn (in the case of

## Removable storage versus hard drives: the race continues

| Year | 1956 | 1971 | 1976 | 1981 | 1982 |
|---|---|---|---|---|---|
| Removable disk and capacity | N/A | 8in floppy invented: 100KB | 5.25in floppy (Shugart associates): 100KB | 3.5in floppy (Sony): 1.44MB | Iomega Bernoulli Box: 10MB |
| Hard drive capacity | 5MB (IBM RAMAC) | N/A | 300MB | 5MB (first desktop PC hard drive) | 5MB |

optical discs) or magnetise (for hard disks) microscopic spots of the storage medium.

On optical drives, these spots are physical pits arranged in a slowly widening spiral around the disc's centre. On hard drives, the spots are clusters of microscopic ferrous particles magnetically manipulated by the drive heads.

Each successive generation of hard drive has shrunk both the size and number of these particles. However, a brick wall looms large: make the particles too small, and they'll be so sensitive to magnetic fields that ambient magnetic fields will re-program them. Your data will be lost if you so much as walk by your computer. This phenomenon, known as the "superparamagnetic limit", is the stuff of nightmares for hard drive engineers.

Optical discs face similar limitations: the delivery of blue laser beams has allowed use of pits just 405nm across compared with 650nm for red DVD lasers, but don't expect much more progress over this rainbow. The next step in this direction involves ultraviolet lasers with wavelengths of around 350nm, but mass-market UV lasers are still well down the track.

### THE NEXT GENERATION

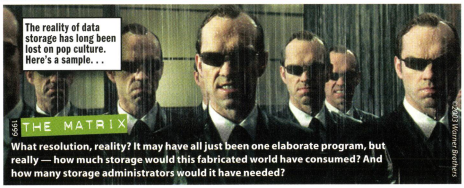
Recognising the limitations of the physical pit-and-beam approach, researchers at Bell Labs spin-off InPhase — backed by chemical and storage giants Bayer Material Science and Maxell — have taken an altogether different approach. In April, they demonstrated a prototype of a holographic storage system that had, in the past, been the stuff of science fiction.

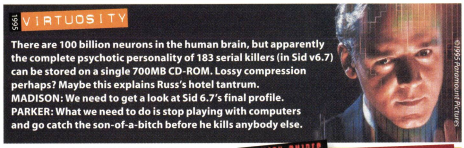
Kevin Curtis, chief technology officer at InPhase, says that next year the company will launch a holographic storage unit three half-height drive bays high, offering 300GB per disc with a 20MB/s transfer rate. This will jump to 800GB at 80MB/s in 2008, and 1.6TB of uncompressed data at 120MB/s by 2010. A rewritable version is also planned for 2008.

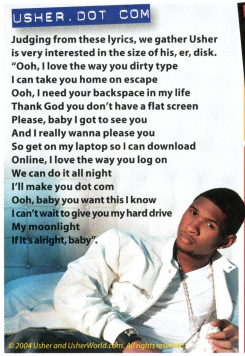
A stamp-sized holographic medium with 1GB to 2GB of ROM storage is on the InPhase drawing board too — although ever-improving CompactFlash, SD and xD cards could make this product irrelevant by the time it actually appears.

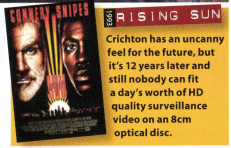
"Optical companies recognise that they have to have a different game plan to get to higher densities," says Curtis.

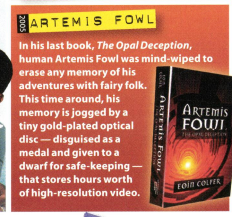
## Storage in popular culture

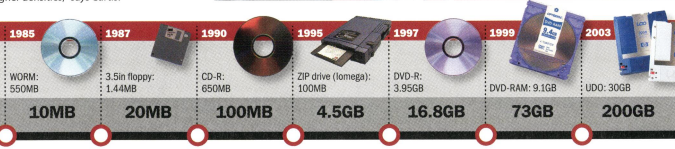


Optical companies aren't the only ones thinking differently about storage. University of Cambridge-affiliated Cavendish Kinetics is commercialising a non-volatile RAM chip design that uses arrays of nano-scale levers to store data permanently. Further, power is only consumed to change the state of the levers from on to off, meaning the chips have ultra-low power consumption that could eventually make them invaluable for storage in mobile devices.

Hard drive makers are also thinking outside the square. Perpendicular recording — which stores data radially from the centre of the disc rather than in a spiral pattern — will emerge next year in full force and, according to IDC, become critical to continued storage growth as current technology runs out of steam by 2007. Storing data this way increases current hard drive capacity (200GB per square inch) several times over, allowing hard drive makers to continue increasing capacity by up to 40% per year.

Perpendicular recording has opened the way for tangential developments. Patterned media, for instance, sidesteps the superparamagnetic limit by shovelling a few dozen ferrous molecules into tiny wells, each representing a bit.

Also on the drawing board is thermally-assisted recording. It uses a medium that is magnetically stable at room temperature but can be modified while heated using a focused light beam.

"Shrinking everything has been the basis of our progress for 50 years, but the fundamental physics of scaling eventually breaks down," says John Best, chief technologist with Hitachi Global Storage Technologies.

"I can't predict the practical engineering limits, but physical densities beyond 10Tbits per square inch aren't out of the question in the 2009 to 2010 timeframe.

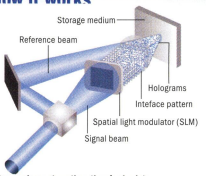
"If we keep on increasing demand at the rate and pace we're talking about, we're going to need it." ETTJ

## InPhase holographic recorder




RECORDING READING

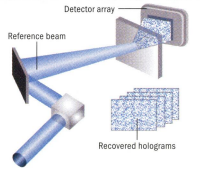
### How it works




**Shine one laser at another, then feed a data signal across one of the lasers and record the changes in the interference patterns the collision produces.**

**These changes, which reflect the transmitted data, are recorded on a light-sensitive disc as "pages" containing 1.3 to 1.6 million bits each. By tilting the reference beam slightly, pages are layered into "books" – InPhase has already demonstrated books with 2,500 pages, and more are on the way – to produce a high-density disc.**

**The disc doesn't spin, but slowly rotates while the recording laser does its thing.**




**To read the data, the reference beam deflects off the hologram, reconstructing the stored information. The hologram is then projected onto a detector, which reads the data in parallel and makes possible the astonishing transfer rates of holographic storage.**

**Unlike conventional technologies that record one data bit at a time, holographic techniques allow a beam of light to write up to a million bits of data in a single flash. This is because holographic records below the surface of the recordable medium, through the full depth of the disc, packing in far more information.**

**All this gives rise to applications such as 300GB single discs.**

| Year | 2004 | 2005 | 2006 (approx) | 2006 (approx) | 2008 (approx) | 2008 (approx) | 2010 (approx) |
|---|---|---|---|---|---|---|---|
| Removable disk and capacity | DVD-DL: 8.5GB | HD-DVD: 25GB; Blu-ray: 50GB | Perpendicular recording: N/A | Holographic recording: 300GB | Nano-scale gradients: 300GB (projected) | Holographic recording: 800GB | Holographic recording: 1.6TB |
| Hard drive capacity | 300GB | 400GB | 1.6TB | N/A | N/A | N/A | N/A |




At Quantum it's our job to help make tape work for you again.

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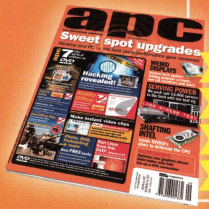
# WIN

## a Palm® Treo™ 650 pack valued at over $1,100 each!

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- **PLUS** the chance to WIN a Palm Treo 650 pack

*Based on newsstand price of $9.80 per issue

# Two lucky subscribers will win the Palm Treo 650, wireless keyboard and Bluetooth headset valued at $1,148.90 each




**Stay connected with the Palm Treo 650 smartphone. It simplifies your life by combining a compact, full-featured mobile phone with email, an organiser, messaging and Web access* — all within easy reach using the Treo 650's finger-friendly QWERTY keyboard.**

## The Treo 650 also features:

- **An MP3 player so you can listen to your tunes.****
- **A digital camera that captures video.**
- **A vibrant colour screen that brings everything to life.**
- **A function to easily send video clips, text messages and photos to friends and colleagues.**
- **An Intel PXA270 processor to get impressive. multimedia performance and power savings.**

The pack includes very handy accessories such as a portable, lightweight wireless keyboard that connects to your handheld wirelessly via Infra-red, making typing text effortless. Also, a Bluetooth headset that connects wirelessly to let you enjoy the freedom of hand- and cord-free conversations. With the Treo 650, smartphones just keep getting smarter.

* Email, messaging and Web access require data services from a mobile service provider at an additional cost. ISP may also be required. Pricing varies by service provider.

** Requires expansion card, sold separately..

CONDITIONS OF ENTRY Information on how to enter and prize forms part of these conditions of entry. 2.Entry is open to all residents of Australia who subscribe or renew their subscription to APC between 14/09/05 and 11/10/05. Entry is automatic upon and subject to the correct use of a valid credit card or, if payment is made by cheque, the cheque must be cleared for payment. Subscriptions are to be sent by mail to *APC*, Reply Paid 3357, Sydney, 2001; or made by telephone on freecall 13 61 16 or via the internet at www.apc.magshop.com.au. Employees of the Promoter and their immediate families and agencies associated with this promotion are ineligible to enter. This offer is not valid in conjunction with any other offer. 3.The Promoter reserves the right to verify the validity of entries and to disqualify any entrant who tampers with the entry process or who submits an entry that is not in accordance with these Conditions of Entry. 4.Only one entry permitted per subscription or subscription renewal.. 5.Promotional period commences 14/09/05 and closes 23:59 EST 11/10/05. All entries will be collated to go into the one draw to ensure that each entrant has a fair and equal chance of winning. The draw will take place at 11am EDST at the Promoters premises on 25/10/05. The winners will be notified by mail and telephone (using contact details provided in the subscription) and their name will be published in the Public Notices section of *The Australian* on 08/11/05. Judges' decision is final and no correspondence will be entered into. 6.The first two valid entries drawn from all entries received will each win a Palm Treo 650 ($949), a Wireless keyboard ($99.95), and a Bluetooth headset ($99.95). Total prize package for each winner is valued at $1,148.90 each. The Promoter accepts no responsibility for any variation in the prize value. Prizes are not transferable or exchangeable and cannot be taken as cash. 7.The Promoter may conduct such further draws at the same time and place as the original draw as are necessary on 28/03/06 in order to distribute any prizes if unclaimed by that date subject however to any written directions given under Reg 37 of the Lottery and Gaming Regulations 1993 (SA). In the event of any winners in the unclaimed prize draw, their names will be published in *The Australian* on 11/04/06. 8.The Promoter shall not be liable for any loss or damage whatsoever which is suffered (including but not limited to indirect or consequential loss) or for any personal injury suffered or sustained in connection with the prize except for any liability, which cannot be excluded by law. 9.The Promoter accepts no responsibility for late, lost or misdirected entries. The Promoter accepts no responsibility for prizes damaged in transit. 10.The Promoter is not responsible for any incorrect or inaccurate information, either caused by the phone user or website user or for any of the equipment or programming associated with or utilised in this competition, or for any technical error, or any combination thereof that may occur in the course of the administration of this competition including any omission, interruption, deletion, defect, delay in operation or transmission, communications line or telephone, mobile or satellite network failure, technical problems or traffic congestion on the Internet or Web site, software failure, theft or destruction or unauthorised access to or alteration of entries and any injury or damage to participants or any other person's computer related to or resulting from participation in or down-loading any materials in this competition. 11.All entries become the property of the Promoter. 12.The collection, use and disclosure of personal information provided in connection with this competition is governed by the Privacy Notice (see contents page for location in this issue) 13.The Promoter is ACP Magazines Pty Ltd (ABN 18 053 273 546) of 54-58 Park Street, Sydney, NSW 1028. 14.Authorised Under NSW Permit No: TPL05/8700. ACT Permit No: TP05/3130. NT Permit No: NT05/2545. SA Permit No:T05/3211.

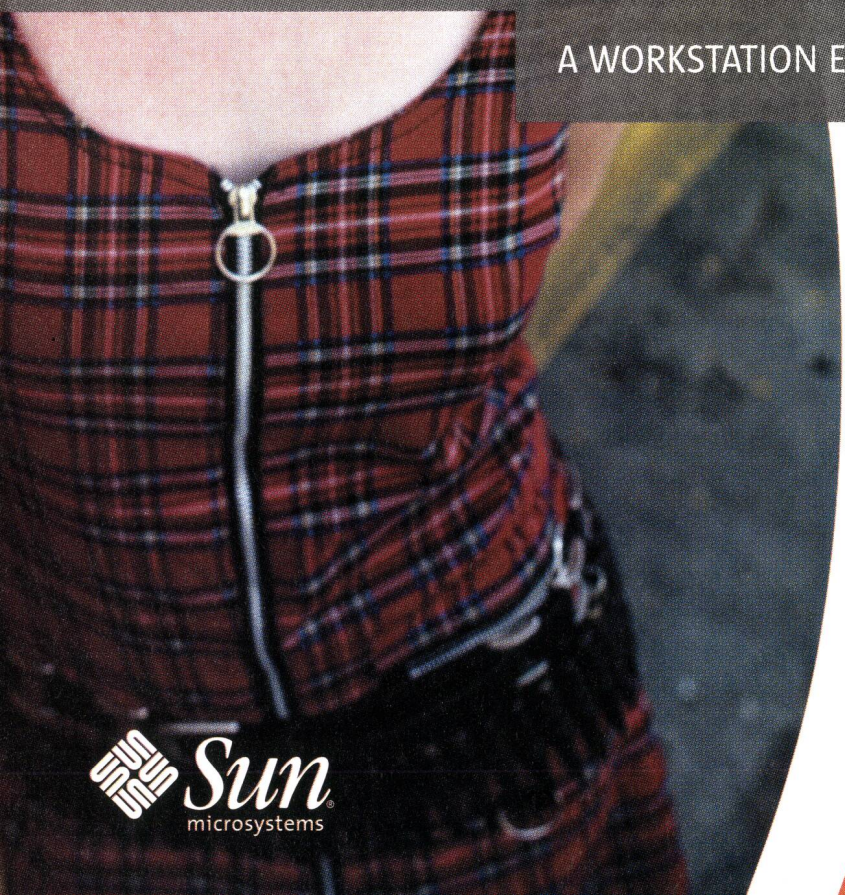
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# SUN MICROSYSTEMS ULTRA 20 WORKSTATION COMPETITION

## Sun Microsystems is giving away three ultra-powerful Sun 20 Workstations to *APC* readers.




**FIRST PRIZE**

Sun Ultra 20 Workstation: 1 AMD Opteron 152 Processor; Quadro FX 1400 Graphics; 2GB ECC PC3200 DDR-400 (2 x 1GB DIMM) Memory; 250GB 7200RPM SATA Hard Disk; 1 x DVD-ROM; 1 x 10/100/1000 BaseT Ethernet port; 6 x USB 2.0 ports; 2 x IEEE1394a ports; 1 x PCI Express x16 slot; 2 x PCI Express x1 slots; 4 x Conventional PCI slots; Solaris 10, Sun Studio, Sun Java Studio Creator, Sun Java Studio Enterprise Pre-Installed; Three-Year Warranty.

**SECOND PRIZE**

Sun Ultra 20 Workstation: 1 AMD Opteron 148 Processor; Quadro NVS 280 Graphics; 1GB ECC PC3200 DDR-400 (2 x 512MB DIMM) Memory; 80GB 7200RPM SATA Hard Disk; 1 x DVD-ROM; 1 x 10/100/1000 BaseT Ethernet port; 6 x USB 2.0 ports; 2 x IEEE1394a ports; 1 x PCI Express x16 slot; 2 x PCI Express x1 slots; 4 x Conventional PCI slots; Solaris 10, Sun Studio, Sun Java Studio Creator, Sun Java Studio Enterprise Pre-Installed, Three-Year Warranty.

**THIRD PRIZE**

Sun Ultra 20 Workstation: 1 AMD Opteron 144 Processor; ATI Entry 2D Graphics; 512 MB Non-ECC PC3200 DDR-400 (2 x 256MB DIMM) Memory; 80GB 7200RPM SATA Hard Disk; 1 x DVD-ROM; 1 x 10/100/1000 BaseT Ethernet port; 6 x USB 2.0 ports; 2 x IEEE1394a ports; 1 x PCI Express x16 slot; 2 x PCI Express x1 slots; 4 x Conventional PCI slots; Solaris 10, Sun Studio, Sun Java Studio Creator, Sun Java Studio Enterprise Pre-Installed; Three-Year Warranty.

The Sun Ultra 20 is the new workstation that takes Sun Microsystems into PC workstation territory. Based on the dual-core AMD Opteron processor, it's compatible with up to eight operating systems, including Microsoft Windows, Linux and Solaris.

## TO ENTER

**Answer the following question: Now that Sun Microsystems is building x86-based workstations in partnership with AMD, what could it teach other PC manufacturers about building high-performance systems?**

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## Wired Mini Mouse

AMU02US RRP: $39.95

> Retractable USB cable
> Small, compact design is ideal for travel yet big enough for desktop use
> Ergonomic – comfortable for left or right-handed users
> Standard 3-button with scroller wheel design enhances productivity

## Video Port Replicator

ACP50AU RRP: $349.95

> Connect peripherals & monitor to notebook via a single USB cable
> Connect your monitor or LCD directly to the docking station
> 4 USB ports - 2 of the power ports provide twice as much power as standard ports



## USB High-Speed 4-Port Hub

ACH62US RRP: $59.95

> 4 Hi-Speed USB Ports - three stationary ports and one wireless adaptor port
> Wireless adaptor port rotates 180°
> Self Powered
> Each port is protected, so entire hub won't shut down if one device draws too much power



## D-Pro Desktop Notebook Stand

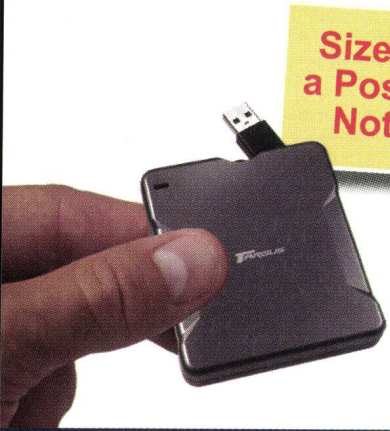
AWE05US RRP: $249.95

> Ergonomic design allows notebook to be used for desktop replacement
> Positions notebook display at four adjustable heights
> Built-in document holder
> Compatible with Targus Video Port Replicator (shown above)
> OEM docking station support via optional Port Replicator Module

## Compact USB Keyboard

AKB05AU RRP: $29.95

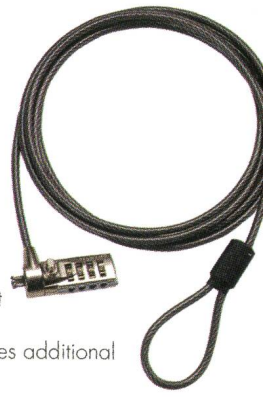
> Compact ¾ keyboard with standard-size keycaps
> Ideal for people with limited work space
> Plug & play - no drivers required




## External USB 2.0 Slim Hard Drive

ADH01US RRP: $499

> Small and lightweight - ideal for travel
> 40GB capacity for all your files
> Powered directly from PC, no AC adaptor required
> Plug and play, no drivers needed
> USB 2.0 High Speed with fast transfer rates



## DEFCON™ Cable Lock

PA410U RRP: $69

> Protect your notebook - easily attaches to any notebook computer equipped with a lock slot
> Set your own password - Up to 10,000 possible combinations that can be set or changed at any time
> Included security base plate provides additional locking solutions

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# Crackdown on "unlimited" deals

**The days of ISPs marketing speed-limited broadband services as unlimited are set to grind to a halt. *Dan Warne* reports.**

Victoria is the first state to take action against ISPs marketing broadband deals that actually have speed or download limits as "unlimited".

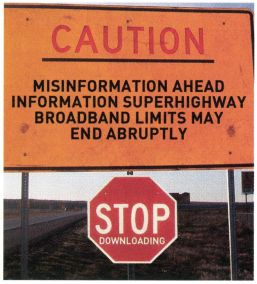
iPrimus was recently publicly rebuked by broadband user forum Whirlpool.net.au for offering an "unlimited broadband" deal with a 500MB usage limit, after which time the broadband speed dropped to near-dialup speed.

At the time, Primus general manager Bryan Yianakis responded: "Primus' use of terminology is entirely consistent with that employed by Telstra, Optus and numerous other ISPs. So why the fuss when Primus uses it?"

Victorian Consumer Affairs Minister Marsha Thomson said, "A leading ISP has withdrawn some advertisements and verbally agreed to refrain from using the word 'unlimited' until they have guidance from authorities under which circumstances — if any — the use of the word is acceptable." Thomson didn't identify the ISP.

"The investigation found many ISPs were promoting offers of 'unlimited broadband downloads', when in fact download limits, such as 500MB, applied. This often meant users were restricted to speeds similar to that of the slower dialup services once this limit was reached," she added.

Thomson said that Consumer Affairs Victoria (CAV) had written to a number of ISPs outlining its concerns with the inappropriate use of the word "unlimited" as well as other issues identified with their marketing materials.




**Users of certain "unlimited" broadband accounts may be getting less than what they bargained for.**

"Complaints will be taken seriously, as CAV is committed to ensuring Victorians get a fair go," she said. Victorians can complain directly to Consumer Affairs Victoria on 1300 558 181. All other states have Fair Trading department call centres to take their complaints.

## Most complained-about ISPs

| ISP | COMPLAINTS (FIRST QRTR 2005) |
|---|---|
| | 0 — 1,500 |
| BigPond | 1,472 |
| Optus | 560 |
| Primus | 383 |
| Dodo | 383 |
| TPG | 212 |

***A* BigPond spokesperson said: "We take very seriously complaints made to the TIO, and we are constantly reviewing issues and complaints raised by our customers. While we have been making significant improvements in improving customer service, we do not shy away from the fact that more needs to be done.**

**"Despite record numbers of customers joining BigPond, it appears the proportion of complaints per number of services in operation has fallen. Comparing results between ISPs is not valid without detailed analysis of the types of complaints each has received."**

## Is that a router on your TV?

**Netgear has launched a wireless router that allows Topfield digital TV PVRs to download electronic program guides directly from the Internet. The WGT634U plugs in to the Topfield PVR5000t via its USB port.**

**TV guides are supplied by the subscription-based ICE-TV EPG service, created because some Australian TV networks won't release their official guide data free of charge. The combo allows TV recordings to be scheduled by name rather than timeslot.**



## Your monthly guide to the best deals

*APC* is proud to partner with the independent broadband monitoring service Broadband Choice (**http://broadbandchoice.com.au**) to bring you the best ADSL and cable deals.

The comparison table on the following pages focuses on Internet service providers that best serve the majority of *APC* readers' needs. These include coverage in Melbourne, Brisbane and Sydney; and 1300, 13 or 1800 telephone support.

Only those meeting at least three of our four plan selection criteria are listed:

- Budget plan: cheapest deal under $30/month.
- Light plan: cheapest deal under $65/month, with at least 512Kbit/s speed and 1GB data.
- Family plan: largest download allowance under $90/month, at least 512Kbit/s and 5GB data.
- High speed: cheapest 1.5Mbit/s plan under $100/month, with 4GB data minimum.

If an ISP has "unlimited downloads" but speed is throttled after reaching a certain limit, the portion in which you can get full-speed downloads is listed as its limit.

*APC* has picked the lowest price for a contract period of six months or less for broadband installation. Otherwise, the lowest priced option was selected.

The installation price doesn't include a modem because you may get better value by buying one separately. Turn to the Best Buys section on page 52 for our recommendation of the best broadband modem/router currently available.

Can't find your provider in our list? That's because some of the largest ISPs, and many smaller ones, didn't meet the selection criteria. You may still find better deals from small ISPs that only service your local area or state.

ISPs enter their own information into the Broadband Choice database.

ISPs can contact **bc@whirlpool.net.au** for more details. *Data for the following table was extracted from the Broadband Choice database on 22 July 2005.*

# BROADBAND DIRECTORY

| Name | Phone | Online | Budget plan (under $30) | Light plan (under $65, 10GB data limit, at least 512kbit/s minimum) | Family plan (under $90, minimum 5GB data limit, at least 512kbit/s) | High-speed plan (under $150, minimum 4GB data limit, at least 1.5Mbit/s) | National | Emails | Spam filtering | Setup fee | Data transfer |
|---|---|---|---|---|---|---|---|---|---|---|---|
| .Netcall | 1300 554 875 | www.netcall.com.au | $24^ 4GB 256kbit/s | $29^ 2GB 512kbit/s | $42^ 24GB 512kbit/s | $60^ 8GB 1.5Mbit/s | ✘ | 15 | ✔ | $145 6 mths | ✔ |
| .Netcall | 1300 554 875 | www.netcall.com.au | $24^ 4GB 256kbit/s | $26^ 2GB 512kbit/s | $62^ 24GB 1.5Mbit/s | $58^ 8GB 1.5Mbit/s | ✘ | 15 | ✔ | $115 12 mths | ✔ |
| .Netcall | 1300 554 875 | www.netcall.com.au | $17+^ 3GB 256kbit/s | $22+^ 4GB 512kbit/s | $52+^ 16GB 512kbit/s | $42+^ 4GB 1.5Mbit/s | ✘ | 15 | ✔ | $145 6 mths | ✔ |
| 4.0 ADSL | 1300 784 472 | www.4dot0.net | $13.95^ 250MB 256kbit/s | $62.95 No limit 512kbit/s | $62.95 No limit 512kbit/s | N/A | ✘ | 100 | ✔ | $121 3 mths | ✔ |
| aaNet ADSL | 1300 880 692 | www.aanet.com.au | $25^ 512MB 256kbit/s | $29^ 1GB 512kbit/s | $65^ 24GB 512kbit/s | $45^ 8GB 1.5Mbit/s | ✘ | 15 | ✔ | $145 6 mths | ✔ |
| aaNet ADSL | 1300 880 692 | www.aanet.com.au | $29^ 1GB 512kbit/s | $29^ 1GB 512kbit/s | $50^ 25GB 512kbit/s | $60^ 4GB 1.5Mbit/s | ✘ | 15 | ✔ | $88 12 mths | ✔ |
| AAPT smartchat | 13 88 88 | www.aapt.com.au | $29.95† 200MB 256kbit/s | $59.95† 12GB 512kbit/s | $59.95† 12GB 512kbit/s | $89.95† 12GB 1.5Mbit/s | ✔ | 6 | ✔ | $99 1 mth | ✘ |
| Aardvark Internet | 1800 227 382 | www.aardvark.net.au | $29.95^ 200MB 256kbit/s | $64.50^ 1.5GB 512kbit/s | $87.50 50GB 512kbit/s | N/A | ✔ | 5 | ✔ | $130 6 mths | ✔ |
| Acenet Internet | 1300 859 985 | www.acenet.net.au | $24.95†^ 250MB 256kbit/s | $59.95^ 2.5GB 512kbit/s | $89.95 20GB 512kbit/s | N/A | ✘ | 5 | ✔ | $99 6 mths | ✔ |
| Alphalink | 1300 360 638 | http://home.alphalink.com.au | $29.70^ 200MB 256kbit/s | $44.90 1GB 512kbit/s | $89 30GB 512kbit/s | $99.90 10GB 1.5Mbit/s | ✔ | 5 | ✔ | $121 1 mth | ✔ |
| Aspark ADSL | 1300 662 300 | www.aspark.com.au | $25† 15GB 256kbit/s | $35† 25GB 512kbit/s | $79.95 No limit 512kbit/s | $74.95 35GB 1.5Mbit/s | ✔ | 100 | ✔ | $99 1 mth | ✔ |
| AussieWide Internet | 1300 556 491 | www.aussiewide.com | N/A | $59.95 30GB 512kbit/s | $59.95 30GB 512kbit/s | $99 30GB 1.5Mbit/s | ✔ | 4 | ✔ | $132 6 mths | ✔ |
| Australia Internet Solutions | 1300 887 877 | www.ais.net.au | $24.95^ 200MB 256kbit/s | $59.95^ 5GB 512kbit/s | $84.95 No limit 512kbit/s | N/A | ✘ | 5 | ✔ | $125 6 mths | ✔ |
| Australis Internet | 1800 288 871 | www.australis.net | N/A | $44.95 25GB 512kbit/s | $70.95 35GB 1.5Mbit/s | $70.95 35GB 1.5Mbit/s | ✔ | 25 | ✔ | $149 1 mth | ✔ |
| Aztec ISP Home broadband | 1300 768 513 | www.aztec.asnz.com | N/A | $39.95 25GB 512kbit/s | $69.95 35GB 1.5Mbit/s | $69.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| B Digital ADSL | 13 33 44 | www.bdigital.com.au | $24.95^ 300MB 256kbit/s | N/A | $69.95 12GB 512kbit/s | $94.95 12GB 1.5Mbit/s | ✘ | 10 | ✔ | $119 6 mths | ✔ |
| BIT.net | 1300 248 638 | www.bit.net.au | $23.95^ 600MB 256kbit/s | $41.95 2GB 512kbit/s | $69.95 No limit 512kbit/s | $79.95 6GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 6 mths | ✔ |
| Bizmail Broadband | 1300 797 774 | www.bizmail.com.au | $29^ 250MB 256kbit/s | $40^ 6GB 512kbit/s | $69 No limit 512kbit/s | $89^ 16GB 1.5Mbit/s | ✘ | 10 | ✔ | $129 6 mths | ✔ |
| Brown Bear ADSL 12 Months | 1300 730 720 | www.brownbear.net.au | $29.95 1GB 256kbit/s | $39.95 1GB 512kbit/s | $58 30GB 512kbit/s | $89 10GB 1.5Mbit/s | ✔ | 100 | ✔ | $99 12 mths | ✔ |
| Brown Bear ADSL 6 Months | 1300 730 720 | www.brownbear.net.au | N/A | $49 10GB 512kbit/s | $58 30GB 512kbit/s | $89 10GB 1.5Mbit/s | ✔ | 100 | ✔ | $119 6 mths | ✔ |
| Bullet Internet ADSL | 1300 137 454 | www.bullet.net.au | $27.95^ 200MB^ 256kbit/s | $49.95^ 3GB^ 512kbit/s | $69.95^ 12GB^ 512kbit/s | $99.95 15GB^ 1.5Mbit/s | ✘ | 5 | ✔ | $150 12 mths | ✔ |
| Chariot netconnect | 1300 137 425 | www.chariot.net.au | $29.95^ 500MB 256kbit/s | $59.95^ 12GB 512kbit/s | $79.95 20GB 512kbit/s | $85.95^ 12GB 1.5Mbit/s | ✘ | 5 | ✔ | $110 6 mths | ✔ |
| Cheetah by Ozzieweb | 1300 727 374 | www.cheetah.net.au | $29.95^ 200MB 256kbit/s | N/A | $87.95 30GB 512kbit/s | $99.95 15GB 1.5Mbit/s | ✔ | 5 | ✔ | $129 6 mths | ✔ |
| Comcen Internet | 1300 300 324 | www.comcen.com.au | $19.95^ 200MB 256kbit/s | $39.95^ 1GB^ 512kbit/s | $79.99 No limit 512kbit/s | $59.95^ 5GB^ 1.5Mbit/s | ✔ | 5 | ✔ | $99 6 mths | ✔ |
| ComeOnAussie Home ADSL | 1300 361 317 | www.comeonaussie.net | N/A | $39.95 25GB 512kbit/s | $69.95 35GB 1.5Mbit/s | $69.95 35GB 1.5Mbit/s | ✔ | 50 | ✔ | $129 12 mths | ✔ |
| ComeOnAussie Business ADSL | 1300 361 317 | www.comeonaussie.net | N/A | $59.95^ 25GB 512kbit/s | $84.95^ 35GB 1.5Mbit/s | $84.95^ 35GB 1.5Mbit/s | ✔ | 10 | ✔ | $129 12 mths | ✔ |
| Curl DSL | 1300 135 908 | http://curl.com.au | $29.95† 15GB 256kbit/s | $34.95† 25GB 512kbit/s | $84.95†^ 35GB 1.5Mbit/s | $84.95†^ 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $129 1 mth | ✔ |
| Cybernet ADSL | 1300 133 599 | www.cybernetinternet.com | $19^ 200MB 256kbit/s | $49.95 25GB 512kbit/s | $79.95 35GB 1.5Mbit/s | $79.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $49 6 mths | ✔ |
| CyberOne ADSL | 1300 720 062 | www.cyberone.com.au | $15.95^ 200MB 256kbit/s | $59.95 No limit 512kbit/s | $59.95 No limit 512kbit/s | $89.95 No limit 1.5Mbit/s | ✔ | 30 | ✔ | $119 6 mths | ✔ |
| D2 ADSL | 1300 131 368 | www.d2.net.au | $29.95^ 200MB 256kbit/s | N/A | $74.95 10GB 512kbit/s | $99.95 10GB 1.5Mbit/s | ✔ | 10 | ✘ | $119.95 6 mths | ✔ |
| DCSI | 1300 665 575 | www.dcsi.net.au | $29.95 500MB 256kbit/s | $49.95 10GB 512kbit/s | $59.95 20GB 512kbit/s | $79.95 20GB 1.5Mbit/s | ✔ | 6 | ✔ | $125 6 mths | ✔ |
| DigiPlus | 13 34 41 | www.digiplus.com.au | $24.95^ 300MB 256kbit/s | N/A | $74.95 10GB 512kbit/s | $99.95 10GB 1.5Mbit/s | ✔ | 5 | ✘ | $129 1 mth | ✔ |
| Dodo | 13 16 02 | www.dodo.com.au | $24.90^ 250MB^ 256kbit/s | $39.90^ 1GB^ 512kbit/s | $74.90 No limit 512kbit/s | $69.90^ 10GB^ 1.5Mbit/s | ✔ | 30 | ✘ | $129 1 mth | ✔ |
| Dragfast Budget ADSL | 1800 069 050 | www.dragnet.com.au | $26.95^ 200MB^ 256kbit/s | N/A | $69.95 10GB^ 512kbit/s | $95.95 10GB^ 1.5Mbit/s | ✔ | 1 | ✔ | $100 6 mths | ✔ |
| E-SOUL | 1300 367 258 | www.esoulnet.com.au | N/A | $52.95 25GB 512kbit/s | $89.95 35GB 1.5Mbit/s | $89.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $129 6 mths | ✔ |
| EFTel/Datafast | 1300 136 638 | http://w3.eftel.com | $29.95^ 400MB 256kbit/s | N/A | $69.95 No limit 512kbit/s | $99.95 40GB 1.5Mbit/s | ✘ | 2 | $5 | $125 1 mth | ✔ |
| Empcom ADSL Service | 1300 731 368 | www.empcom.net | N/A | $44.95†^ 2GB 512kbit/s | $69.95† No limit 512kbit/s | $79.95† 5GB 1.5Mbit/s | ✔ | 5 | ✘ | $129 6 mths | ✔ |
| Encomm Home ADSL | 1300 739 455 | www.encomm.com.au | $29.95^ 200MB 256kbit/s | N/A | $65.95 10GB 512kbit/s | $89.95 10GB 1.5Mbit/s | ✔ | 1 | ✘ | $129 3 mths | ✔ |
| Escape Online | 1300 131 003 | www.escapenet.com.au | $29.95^ 500MB 256kbit/s | $59.95^ 5GB 512kbit/s | $89.95^ 8GB 512kbit/s | $99.95^ 5GB 1.5Mbit/s | ✔ | 5 | ✔ | $165 6 mths | ✔ |
| FutureWeb Pty Ltd | 1300 361 355 | www.futureweb.com.au | N/A | $49.95 1.5GB 512kbit/s | $68.95 30GB 512kbit/s | $89.95 5GB 1.5Mbit/s | ✔ | 2 | ✔ | $120 6 mths | ✔ |
| Gday.net Lifestyle ADSL | 1300 668 640 | http://internet.gday.net | $29.95^ 200MB^ 256kbit/s | $64.95^ 1.5GB^ 512kbit/s | $89.95 No limit 512kbit/s | N/A | ✔ | 5 | ✘ | $159 6 mths | ✘ |
| Global Dial ZapDSL | 1300 130 710 | www.globaldial.com | $29.95^ 300MB 256kbit/s | $49.95 2GB^ 512kbit/s | $79.95 No limit 512kbit/s | $89.95 14GB^ 1.5Mbit/s | ✔ | 10 | ✔ | $99 6 mths | ✔ |
| Goldlink ADSL | 1300 654 024 | www.goldlink.com.au | $29.95 500MB 256kbit/s | $49.95 25GB 512kbit/s | $69.95 35GB 1.5Mbit/s | $69.95 35GB 1.5Mbit/s | ✔ | 10 | ✔ | $99 6 mths | ✔ |
| Hando ISP xDSL Broadband Internet | 1300 306 131 | www.hando.com.au | $29.95 1GB 256Kbit/s | $39.95 5GB 512kbit/s | $84.95^ 20GB 1.5Mbit/s | $64.95 15GB 1.5Mbit/s | ✔ | 5 | ✔ | $124.95 12 mths | ✔ |
| Hi Speed Communications ADSL | 1300 732 260 | www.hispeedit.com.au | N/A | $44.95 1.5GB 512kbit/s | $89.95 50GB 512kbit/s | $79.95 5GB 1.5Mbit/s | ✔ | 3 | ✔ | $129.95 6 mths | ✔ |
| Hotkey Internet | 1300 655 366 | www.hotkey.net.au | $24.95^ 200MB 256kbit/s | $39.95^ 1GB 512kbit/s | $69.95 10GB 512kbit/s | $79.95^ 5GB 1.5Mbit/s | ✔ | 5 | ✘ | $99 1 mth | ✔ |
| Hotwire ADSL | 1300 653 863 | www.hotwire.net.au | N/A | $42.95 25GB 512kbit/s | $69.95 35GB 1.5Mbit/s | $69.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $109 12 mths | ✔ |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hylinx ADSL** | 1300 132 014 | www.hylinx.com | N/A | $59.95 25GB 512Kbit/s | $89.95 35GB 1.5Mbit/s | $89.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $129 6 mths | ✔ |
| **iinet.net.au ADSL** | 13 19 17 | www.iinet.net.au | $29.95†* 500MB 1.5Mbit/s | $39.95† 2GB+ 1.5Mbit/s† | $89.95† 40GB+ 1.5Mbit/s† | $49.95† 10GB+ 1.5Mbit/s† | ✔ | 10 | ✔ | $119 6 mths | ✔ |
| **iinet.net.au ADSL (12Mbit)** | 13 19 17 | www.iinet.net.au | $29.95†* 500MB 12Mbit/s | $39.95† 2GB+ 12Mbit/s† | $89.95† 40GB+ 12Mbit/s† | $49.95† 10GB+ 12Mbit/s† | ✘ | 10 | ✔ | $119 6 mths | ✘ |
| **Incatel DSL** | 1300 855 554 | www.incatel.com.au | N/A | $39.95 1GB 512Kbit/s | $75.95 40GB 512Kbit/s | $65.95 10GB 1.5Mbit/s | ✘ | 5 | ✔ | $145 6 mths | ✔ |
| **Instant Communications ADSL** | 1300 139 369 | www.in.com.au | N/A | $59.95 No limit 512Kbit/s | $59.95 No limit 512Kbit/s | $99.95 500G+ 1.5Mbit/s | ✔ | 5 | ✔ | $99 6 mths | ✔ |
| **Internode Home ADSL** | 13 66 33 | http://adsl.internode.on.net | $29.95 500MB 256Kbit/s | $39.95 2GB 512Kbit/s | $69.95 30GB 512Kbit/s | $69.95 30GB 512Kbit/s | ✔ | 5 | ✔ | $129 6 mths | ✔ |
| **iPrimus Standard** | 1300 854 848 | www.iprimus.com.au | $19.95* 200MB 256Kbit/s | $39.95 1GB 512Kbit/s | $59.95 12GB 512Kbit/s | $69.95 5GB 1.5Mbit/s | ✔ | 5 | $2 | $99 12 mths | ✘ |
| **iPrimus 2000K+** | 1300 854 848 | www.iprimus.com.au | $29.95†* 400MB 2Mbit/s | $49.95 12GB 2Mbit/s | $49.95 12GB 2Mbit/s | $49.95 12GB 2Mbit/s | ✘ | 5 | $2 | $99 12 mths | ✘ |
| **iSage Internet** | 1300 725 789 | www.isage.ausz.net | $29.95† 15GB 256Kbit/s | $34.95† 25GB 512Kbit/s | $84.95† 35GB 1.5Mbit/s | $84.95† 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| **Kooee ADSL** | 1300 733 747 | www.kooee.com.au | $24.95* 300MB 256Kbit/s | N/A | $69.95 12GB 512Kbit/s | $94.95 12GB 1.5Mbit/s | ✘ | 10 | ✔ | $119 6 mths | ✔ |
| **Linc Net** | 1300 721 225 | http://lincnet.com.au | N/A | $54.95 1GB 512Kbit/s | $74.95 40GB 512Kbit/s | $84.95 10GB 1.5Mbit/s | ✔ | 10 | ✔ | $129 6 mths | ✔ |
| **Matilda Internet ADSL** | 1300 665 865 | www.matilda.net.au | $29.95* 200MB 256Kbit/s | $49.95* 1GB 512Kbit/s | $59.95 10GB 512Kbit/s | $89.95 10GB 1.5Mbit/s | ✔ | 5 | ✔ | $110 1 mth | ✔ |
| **Midcoast Internet** | 1300 134 638 | www.midcoast.com.au | $28.50* 200MB^ 256Kbit/s | N/A | $90 No limit 512Kbit/s | $98* 10GB^ 1.5Mbit/s | ✔ | 5 | ✔ | $130 6 mths | ✔ |
| **Nethy Xtreme DSL** | 1300 733 215 | www.netbay.com.au | $24.95* 200MB 256Kbit/s | $49.95* 4GB 512Kbit/s | $79.95 No limit 512Kbit/s | $99.95* 15GB 1.5Mbit/s | ✔ | 5 | ✔ | $120 6 mths | ✔ |
| **Netspace Home ADSL** | 13 14 56 | www.netspace.net.au | $29.95* 300MB 256Kbit/s | $49.95 5GB+ 512Kbit/s | $59.95 No limit 512Kbit/s | $59.95 5GB+ 1.5Mbit/s | ✔ | 10 | ✔ | $109 6 mths | ✔ |
| **OiS 12 Months** | 1300 730 720 | www.optraweb.com.au | $29.95 1GB 256Kbit/s | $39.95 1GB 512Kbit/s | $59 30GB 512Kbit/s | $90 10GB 1.5Mbit/s | ✔ | 100 | ✔ | $99 12 mths | ✔ |
| **OiS 6 Months** | 1300 730 720 | www.optraweb.com.au | N/A | $50 10GB 512Kbit/s | $59 30GB 512Kbit/s | $90 10GB 1.5Mbit/s | ✔ | 100 | ✔ | $109 6 mths | ✔ |
| **OptusNet Cable** | 1800 504 504 | http://broadbandsales.optusnet.com.au | $29.95† 200MB 10Mbit/s | $49.95† 1GB 10Mbit/s | $64.95† 12GB+ 10Mbit/s | $64.95† 12GB+ 10Mbit/s | ✘ | 5 | ✔ | $39 12 mths | ✘ |
| **OptusNet DSL** | 1800 504 504 | http://broadbandsales.optusnet.com.au | $29.95† 200MB 256Kbit/s | $49.95† 1GB 512Kbit/s | $69.95† 12GB+ 512Kbit/s | $98.95† 12GB+ 1.5Mbit/s | ✘ | 5 | ✔ | $39 12 mths | ✔ |
| **OzEmail ADSL (Telstra DSLAM)** | 13 35 93 | http://homesite.service.ozemail.com.au | $29.95†* 500MB 1.5Mbit/s | $39.95† 2GB+ 1.5Mbit/s | $89.95† 40GB+ 1.5Mbit/s | $49.95† 10GB+ 1.5Mbit/s | ✔ | 10 | ✔ | $119 6 mths | ✔ |
| **Broadband2 - OzEmail DSLAM** | 13 35 93 | http://homesite.service.ozemail.com.au | $29.95†* 500MB 8Mbit/s | $39.95† 2GB+ 8Mbit/s | $89.95† 40GB+ 8Mbit/s | $49.95† 10GB+ 8Mbit/s | ✘ | 10 | ✔ | $119 6 mths | ✘ |
| **OzForces Residential ADSL** | 1300 134 081 | www.ozforces.com | $24.95* 200MB 256Kbit/s | N/A | $68.95 No limit 512Kbit/s | $89.95 No limit 1.5Mbit/s | ✔ | 5 | ✔ | $119 6 mths | ✔ |
| **Pacific Business DSL** | 133 635 | www.pacific.net.au | N/A | $64.95 5GB 512Kbit/s | $79.95 10GB 512Kbit/s | $99.95 5GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| **People Telecom Unlimited ADSL** | 1300 558 888 | www.peopletelecom.com.au | $29.95 1GB 256Kbit/s | $39.95 1GB 512Kbit/s | $59.95 25GB 512Kbit/s | $79.95 15GB 1.5Mbit/s | ✘ | 10 | ✔ | $99 12 mths | ✔ |
| **People Telecom Flexible ADSL** | 1300 558 888 | www.peopletelecom.com.au | $29.95* 1GB 256Kbit/s | $39.95* 1GB 512Kbit/s | $59.95* 25GB 512Kbit/s | $79.95* 15GB 1.5Mbit/s | ✘ | 10 | ✔ | $99 12 mths | ✔ |
| **Primus-ADL Standard** | 1800 265 777 | www.primusonline.com.au | $24.95* 300MB 256Kbit/s | $49.95 2GB 512Kbit/s | $69.95 12GB 512Kbit/s | N/A | ✔ | 7 | ✘ | $149 3 mths | ✘ |
| **Primus-ADL 2000K+** | 1800 265 777 | www.primusonline.com.au | $29.95* 400MB 2Mbit/s | $49.95 12GB 2Mbit/s | $49.95 12GB 2Mbit/s | $49.95 12GB 2Mbit/s | ✘ | 7 | ✘ | $149 3 mths | ✘ |
| **Rapid Net ADSL** | 1300 724 677 | www.rapidnet.com.au | $29.95* 200MB 256Kbit/s | $49.95 25GB 512Kbit/s | $79.95 35GB 512Kbit/s | $79.95 35GB 1.5Mbit/s | ✔ | 3 | ✔ | $119 12 mths | ✔ |
| **Reset Residential xDSL** | 1300 662 670 | www.reset.net.au | $29.95* 500MB 256Kbit/s | $49.95 25GB 512Kbit/s | $89.95 35GB 1.5Mbit/s | $89.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| **Schaelec Residential Grade DSL** | 1300 554 687 | www.Schaelec.com.au | N/A | $37.95 25GB 512Kbit/s | $63.95 35GB 1.5Mbit/s | $63.95 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| **Schaelec Business Grade DSL** | 1300 554 687 | www.Schaelec.com.au | N/A | $57.95* 25GB 512Kbit/s | $81.95* 35GB 1.5Mbit/s | $81.95* 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| **Shiftbroad Broadband** | 1300 735 623 | www.shiftreload.com.au | N/A | $47.95* 4GB 512Kbit/s | $75.95 No limit 512Kbit/s | $97.95* 15GB 1.5Mbit/s | ✘ | 35 | ✔ | $139 6 mths | ✔ |
| **Southern Phone National ADSL** | 131 464 | http://southernphone.com.au | N/A | $44.95† 25GB 512Kbit/s | $89.95† 35GB 512Kbit/s | $89.95† 35GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 12 mths | ✔ |
| **Spin Internet** | 1300 303 375 | www.spin.net.au | $22.95* 200MB+ 256Kbit/s | $49.95* 4GB+ 512Kbit/s | $79.99 No limit 512Kbit/s | $89.95* 5GB+ 1.5Mbit/s | ✔ | 5 | ✔ | $99 6 mths | ✔ |
| **ST ADSL Internet** | 1300 138 177 | www.stelecom.com.au | $29.70* 200MB 256Kbit/s | N/A | $83.93 40GB 512Kbit/s | $99.99 10GB 1.5Mbit/s | ✔ | 3 | ✘ | $99 6 mths | ✔ |
| **Supernerd SuperDSL** | 1300 888 090 | www.supernerd.com.au | N/A | $44.95* 4GB 512Kbit/s | $64.95 10GB 512Kbit/s | $99.95* 20GB 1.5Mbit/s | ✘ | 5 | ✔ | $100 6 mths | ✔ |
| **TeeGee Internet ADSL** | 1300 731 132 | www.teegee.com.au | $24.95* 1GB 256Kbit/s | $29.95* 3GB 512Kbit/s | $39.95* 25GB 512Kbit/s | $64.95* 8GB 1.5Mbit/s | ✔ | 5 | ✔ | $99 1 mth | ✔ |
| **Tel.Pacific** | 1300 369 888 | www.telpacific.com.au | $29.95* 200MB $1.2Kbit/s | $49.95 No limit 512Kbit/s | $49.95 No limit 512Kbit/s | $79.95 No limit 1.5Mbit/s | ✘ | 5 | ✔ | $129 6 mths | ✔ |
| **Telstra BigPond Cable** | 131 282 | www.bigpond.com | $29.95* 200MB^ 10Mbit/s | $59.95 10GB^ 10Mbit/s | $59.95 10GB^ 10Mbit/s | $59.95 10GB^ 10Mbit/s | ✘ | 1 | $3 | $189 3 mths | ✘ |
| **TPG Metro ADSL** | 1300 360 855 | www.tpg.com.au | $24.95* 200MB 1.5Mbit/s | $49.95 20GB 1.5Mbit/s | $59.95 30GB 1.5Mbit/s | $49.95 20GB 1.5Mbit/s | ✘ | 5 | ✔ | $129 6 mths | ✔ |
| **TSN Broadband** | 131 486 | http://inweb.tsn.cc | $29.95† 1GB 256Kbit/s | $49.95† 13GB 512Kbit/s | $68.95† No limit 512Kbit/s | $99.95† 24GB 1.5Mbit/s | ✔ | 100 | ✔ | $129 6 mths | ✔ |
| **Big Gig ADSL Plans** | 1300 557 300 | www.velocitynet.com.au | $29.95* 300MB 256Kbit/s | $49.50* 4GB 512Kbit/s | $79.50* 50GB 512Kbit/s | $79.50* 4GB 1.5Mbit/s | ✔ | 10 | ✔ | $69 6 mths | ✔ |
| **Veritel Australia** | 1300 669 869 | www.veritel.com.au | $27.95* 200MB 256Kbit/s | $64.95* 1.5GB 512Kbit/s | $89.95 No limit 512Kbit/s | N/A | ✔ | 5 | ✔ | $125 12 mths | ✔ |
| **VIP ADSL** | 1300 851 536 | www.viponline.net.au | N/A | $55 2GB 512Kbit/s | $75 20GB 512Kbit/s | $94 10GB 1.5Mbit/s | ✔ | 5 | ✔ | $0 6 mths | ✔ |
| **Web Ace** | 1800 202 012 | www.webace.com.au | $28.95* 250MB 256Kbit/s | $63.95 3GB+ 512Kbit/s | $72.95 No limit 512Kbit/s | N/A | ✔ | 20 | ✔ | $99 6 mths | ✔ |
| **Westnet Home ADSL** | 131 960 | http://westnet.com.au | $19.95* 200MB 256Kbit/s | $39.95 1GB 512Kbit/s | $79.95 30GB+ 512Kbit/s | $59.95 5GB+ 1.5Mbit/s | ✘ | 6 | $1 | $99 6 mths | ✔ |
| **Wild Internet ADSL + Phone** | 1300 139 453 | www.wildtel.com.au | N/A | $39.95† 25GB 512Kbit/s | $69.95† 35GB 1.5Mbit/s | $69.95† 35GB 1.5Mbit/s | ✔ | 1000 | ✔ | $99 1 mth | ✔ |
| **ZCTS ADSL** | 1300 852 949 | www.zcts.net | N/A | $44 25GB 512Kbit/s | $78.50 35GB 1.5Mbit/s | $78.50 35GB 1.5Mbit/s | ✔ | 20 | ✔ | $49 1 mth | ✔ |

*Key: * ISP charges excess usage fees when you exceed your download limit; † This price only available if bundled with long distance telephony from the ISP; + Additional download allowance available with this plan for use in off-peak periods; ^ ISP combines sent and received data when calculating usage.*

# Wireless mesh networking

**Wireless mesh networks are the hottest thing in wireless networking. *Peter Sbarski* explains how they work.**

How It's Done

Wireless mesh networks are quickly growing in popularity. Relatively easy to set up and administer; these networks are cheap, reliable, efficient and scale very well. They don't suffer from a lot of the problems usually associated with centralised wireless networks, mainly because the data doesn't need to be routed through a central switch. Mesh networks are constructed to be more fault tolerant, self-healing, self-organising and self-configuring.

A mesh network is a form of a peer-to-peer (P2P) network. In a mesh topology, all nodes have several outgoing and incoming connections. In other words, each node is connected to a number of other nodes. This makes it more fault tolerant than other types of network, because if one node goes down, its neighbours can find a way around it.

A node can be any computer system that can send and receive data. Because a mesh network is not based on the server-client architecture, there isn't always an easy or a direct way of controlling shared resources. But it's usually cheaper to build and maintain.

There are a few other advantages. In a wireless mesh network, all nodes act as amplifiers (repeaters) as well as routers. When a particular packet is transmitted, the signal is amplified so the packet can reach the next node. Figuring out where the packet needs to be transferred next is of paramount importance.

The underlying network protocol and its routing algorithm are responsible for getting the packet to the right destination and making sure that it gets there as quickly as possible.

Historically, a fixed-mesh network was considered very expensive because, in theory, every node was supposed to connect to every other node in the system. There was also the partial fixed-mesh network, where only some nodes were connected.

With a wireless mesh network, nodes only connect to others that are within their scope. Most of the time, two nodes located on different sides of the network never directly transmit to each other and there are no cables.

## A MESH OF PROTOCOLS

In a wireless mesh network, there is often an assumption that all nodes are temporary. Nodes can be removed and added at any time, and the location and connectivity options of any node can change.

The problem of packet routing and safe delivery is the responsibility of the protocol. The first of two types of protocols — the Table Driven protocols — require each node to maintain a list of routing paths to other nodes on the network. If there's a change in the network, the information is propagated and the appropriate routing tables are updated.

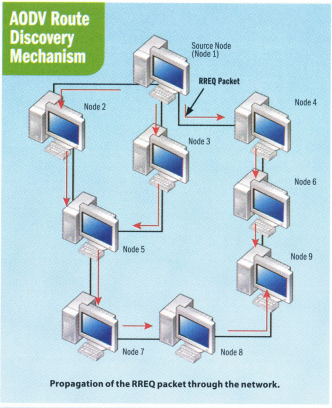
With the second type — On-Demand routing — the routing protocol discovers or creates a path from the source node to the destination node only when it is needed. Most of the time, no prior routing information is kept, and as soon as the path isn't needed, it's removed from memory.

## AD HOC ON DEMAND DISTANCE VECTOR (AODV)

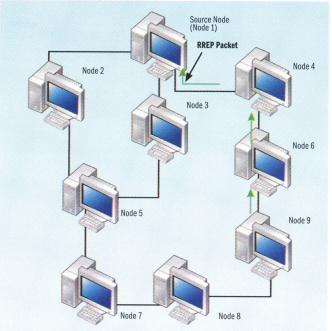
The AODV algorithm (see top right image) is from the On-Demand family. It builds a route to the destination only when it must, but it makes use of routing tables as well. Here's a basic explanation:

**1** If the source node doesn't have a valid route to the destination node, it sends out a route request (RREQ) packet to all of its neighbours. This process is called Path Discovery.

**2** Each node that receives this packet records the address of the node that sent it in its routing table. It then sends a RREQ packet to all neighbours except those recorded in its




**Propagation of the RREQ packet through the network.**




**Route of the RREP packet back at the source node.**

routing table. By following this approach, the network is flooded with RREQ packets.

**3** If the node which just received a RREQ is the destination node, it sends back a route reply (RREP) packet to the node which sent it the RREQ. It doesn't send out any RREP packets itself.

**4** As RREP propagates back through the network, via the temporary path established by RREQ, the nodes it visits record a forward route entry in their routing tables. This specifies the node from which the RREP just came from. The next time a normal data packet comes in, it will be forwarded to this node.

**5** In the end, the source node receives RREP packets and information about how many hops it took to get there.

**6** The source node selects the route that requires the least amount of hops. It only needs to record the node to which it should send the next data packet. This information is kept in the routing table until it's no longer needed, i.e., the node stops sending packets.

**7** Each node that receives a packet knows where to send it next by looking at its routing table and the forward route entry.

Sometimes the RREQ packet doesn't need to travel through the whole network. It may land on an intermediary node that already has a path to the destination. The RREP packet can then be generated. AODV uses sequence numbers to make sure that all routes are loop-free.

If a particular link fails during the operation, an error (RERR) packet is passed back to the originating node, which again finds the shortest possible path.

AODV is capable of delivering data packets to one destination (unicast routing) or multiple destinations (multicast routing).

### DYNAMIC SOURCE ROUTING (DSR)

This protocol (see image, right) is very similar to AODV except it doesn't use routing tables. Instead, the packet that's used in path discovery records all the nodes it visits and keeps this information itself. All nodes also store a route cache that can be considered as a light routing table. Route cache stores possible paths to various nodes and is constantly updated.

DSR has two major phases; the first phase, route discovery, is very similar to that of AODV.

**1** The network is flooded with route request packets, and as packets hop from node to node, they record where they've been.

**2** If a route request packet lands on a node that happens to be the destination, a route reply packet is generated. This then stores the route record and travels back to the source node.

**3** If the node in question wasn't the target, its cache is checked for possible paths. If a path is found in the cache, a route reply packet is generated. If not, the node sends out a route request packet to all its neighbours.

**4** The source node receives all route reply packets and checks their route records.

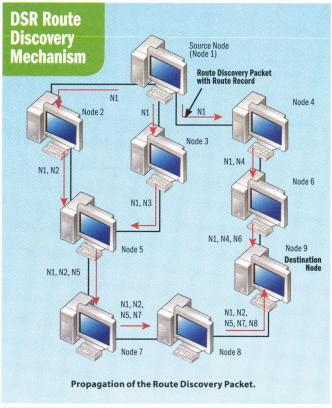
DSR also does some route maintenance. If there is a breakage in the topology, the route cache in each node is modified. Since there's no need for fully fledged routing tables, DSR uses less memory than AODV.

### DESTINATION SEQUENCED DISTANCE VECTOR ROUTING (DSDV)

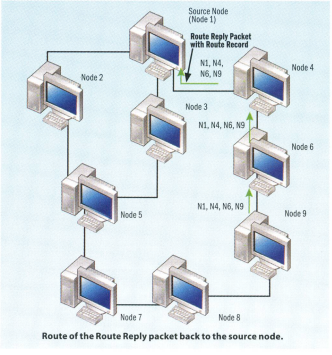
DSDV is a Table Driven protocol. Every node in the network keeps a routing table that lists possible hops (paths) for each destination. Each route also has an associated sequence number that specifies how preferable it is. The higher it is, the better the route. Sequence numbers are generated with the help of destination nodes. They are also used to distinguish newer and possibly better routes from older ones.

Routing tables need to be constantly updated for the network to stay alive. One way of keeping it up-to-date is by using Full Dump packets which contain all routing information. This packet is sent from one node to another. At each node the routing table is updated to match the packet. Alternatively, Incremental Dump packets can be used which only specify the changes since the last Full Dump packet.

The drawback is the routing tables need to be periodically updated and this can be an issue. If updates are carried out too often, the network can become congested. If updates occur too infrequently, the network can become unsynchronised.




**Propagation of the Route Discovery Packet.**




**Route of the Route Reply packet back to the source node.**

### MESH FUTURE

The wireless mesh network has already been used successfully to link rural villages together in India. Hopefully, metropolitan areas will join the party too.

# Getting slipstreamed

***James Bannan* shows you how to create an installation CD customised to suit your system with SP2 built-in.**

A fresh installation of XP is riddled with security holes and outdated drivers. While XP Service Pack 2 (SP2) is the best way to quickly protect your system, it's still a weighty, time-consuming update. It's better to have all possible drivers and service packs integrated into the installation media before you get started.

On the cover DVD

**Bonus DVD software**
Video of this workshop.

**Skill level**
Intermediate

**Requirements**
Windows XP CD • Nero Burning ROM (or equivalent) • ISOBuster.

**Time to complete**
2 hours (approx)

## SERVICING UPDATES

To make your own all-in-one solution, you need to make a local copy of your XP CD. Make a folder called XPCD and copy the entire contents of the CD there — this will become the custom install. Download XP SP2 from Microsoft, but make sure it's the redistributable version for IT professionals (it's the complete install which doesn't require extra content to be downloaded) — WindowsXP-KB835935-SP2-ENU.exe. Save it at C:\XPSP2, and rename it to something manageable like WindowsXPSP2.exe.

If you're not convinced of the benefits of SP2, you can download XP SP1a instead. The procedure outlined for slipstreaming the service pack is exactly the same for all Windows 2000 and XP updates.

Next, extract the files from the executable. You can do this using WinRAR or from the command line. Open a command window (Start > Run > CMD), and navigate to the XPSP2 folder (assuming it and the XPCD folder are in the root of C:\). At C:\XPSP2, type in WindowsXPSP2.exe -x and choose C:\XPSP2 as the destination. This will extract all the service pack files to the local drive.

Update the local XP CD installation files you copied across earlier. Stay in the command window, and navigate to C:\XPSP2\I386\update (these folders have just been created in the extraction process). At the prompt, type update /s:C:\XPCD to start SP2's integrated installation. When complete, SP2 will be slipstreamed into your original XP installation files, and any systems you build using these files will have all the SP2 security enhancements, as well as Windows Firewall, Security Center and Bluetooth support.

## DRIVING IN THE HOT SEAT

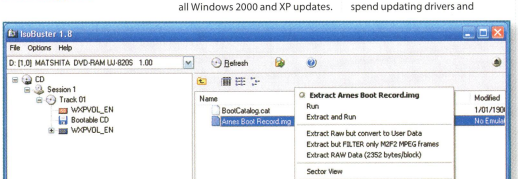
To insert custom hardware drivers, modify the default installation files so that XP knows where to check for extra drivers during the plug-and-play component of the Windows installation. A custom configuration minimises the amount of time you spend updating drivers and rebooting the system post-installation. However, it's not appropriate for all types of hardware. Some manufacturers only provide drivers in an application format, like NVIDIA or ATI graphics cards, and slipstreaming these into an installation isn't recommended. But it works well for other types of hardware such as network adaptors, modems and storage controllers.

A Marvell Yukon 88E8053 Gigabit Ethernet controller and Adaptec 1210SA SATA RAID controller were used for this Workshop, but the process works with any similar hardware. Open up Windows Explorer and navigate to C:\XPCD\I386. Create a folder called $OEM$, then another folder under that called $1, and another folder called Drivers. The structure should now read C:\XPCD\I386\$OEM$\$1\Drivers. In the Drivers folder, create one folder called NIC and another called SATA.

Download the appropriate Ethernet controller driver from the vendor's Web site. Extract all the data to the NIC folder. Then get the latest Adaptec 1210SA driver from **www.adaptec.com** (or a relevant one for your system). This is a self-extracting EXE — extract the contents to a temporary location, then copy all the files in the WIN32 folder to C:\XPCD\I386\$OEM$\$1\drivers\SATA.

Using Notepad, open the file in the temporary folder called txtsetup.oem, and C:\XPCD\I386\txtsetup.sif. Open another blank Notepad file to have three files open. In the blank page, create the following headings:

```
[SourceDisksFiles]
[HardwareIdsDatabase]
[SCSI.load]
[scsi]
```




**1** Right-click on the IMG file in the right-hand panel and select Extract.

Modify the information on this page by copying data from the txtsetup.oem or manually entering it, until the strings look like this:

```
[SourceDisksFiles]
AARSI3X.SYS = 1,,,,,,3_,4,1
[HardwareIdsDatabase]
PCI\VEN_1095&DEV_3512 =
"ADAPTEC_SATARAID_W2K"
[SCSI.load]
ADAPTEC_SATARAID_W2K =
AARSI3X.SYS,4
[scsi]
ADAPTEC_SATARAID_W2K =
"Adaptec Embedded Serial ATA
HostRAID Driver For Windows
2000/XP/2003"
```

Copy all this data and paste it at the end of the txtsetup.sif file before the [] character, otherwise it won't be referenced. Jump into a command window and navigate to C:\XPCD\I386\$OEM$\$1\drivers\SATA. Enter the following command: makecab aarsi3x.sys c:\xpcd\i386\aarsi3x.sy_ . This sets up the relationship between the driver, driver name and the PCI identifier. This is all necessary for Windows to reference the SATA RAID controller during basic setup, at the point where all the basic hardware drivers like IDE and CD controllers are loaded.

The final step is to point Windows in the right direction during the hardware detection phase of the installation, so that it knows to check for extra drivers. Navigate to C:\XPCD\I386 and create a TXT file called WINNT.SIF (be careful not to accidentally save it as WINNT.SIF.TXT). Enter the following information, using the exact syntax:

```
[Data]
AutoPartition=0
MsDosInitiated="0"
UnattendedInstall="Yes"

[Unattended]
UnattendMode=ProvideDefault
OemPreinstall=Yes
OemSkipEula=Yes
NoWaitAfterTextMode=1
NoWaitAfterGUIMode=1
WaitForReboot="No"
TargetPath=\WINDOWS
DriverSigningPolicy=Ignore
OemPnPDriversPath=drivers/
NIC;drivers/SATA

[GuiUnattended]
OEMSkipWelcome = 1

[UserData]
ProductKey=
FullName=""
OrgName=""
```

This is the basic structure of an unattended installation of XP, but doesn't cover the full range of options available at this point. The UnattendedInstall="Yes" line forces the setup engine to look at the [Unattended] area for extra information, which is where the custom driver locations have been specified, in OemPnp DriversPath. This maps directly to installroot\I386 (in this case C:\XPCD\I386, or D:\I386 once it has been burned to CD). To prevent unsigned device drivers causing the process to hang pending user intervention, DriverSigning Policy must be set to Yes, and OemPreinstall=Yes must also be present to make use of the $OEM$ folders.

To make the installation even smoother, add another line in the [Data] area which reads AutomaticUpdates=yes. This skips the SP2 Automatic Updates configuration when you first start Windows — you can configure this later. In the [UserData] section, type in your Windows XP serial in ProductKey, and you won't be prompted for it. The same applies for FullName and OrgName (your name and company name). You can also enter ComputerName=xx and under [GuiUnattended] you can specify the Administrator password as AdminPassword=. The text you choose will be the password — if you type in an asterisk (*), the password will be blank. If you do put in a password, also add the line EncryptedAdmin Password=yes — this will scramble the text in the WINNT.SIF file.

### BRING IT ALL TOGETHER

The local install files now have your custom drivers and SP2 integrated. But if you burned the file structure to CD as it exists, it wouldn't be bootable. You can extract the boot image from your original Windows XP CD, and incorporate that into the customised setup to create a proper boot CD.

1 Install IsoBuster, available to download from **www.isobuster.com** or the APC August cover DVD. Install the application, insert the original XP CD and then launch IsoBuster. You don't need to register to use this particular functionality. Expand the CD structure and highlight Bootable CD. An IMG file will be visible in the right-hand panel — either Microsoft Corporation.img or Arnes Boot Record.img. Right-click on the file and select Extract (the top option), and save it in C:\XPCD.

To burn the compilation, you need a decent burning application like Nero or Roxio — something that can handle customised image burning. Nero was used in this example.

Launch Nero and select to create a new CD-ROM (Boot) compilation. On the Boot tab, click the Image File radio button and browse to the IMG file which you extracted using IsoBuster. Click the button to enable expert settings — change the emulation type to No Emulation. Leave the Load segment hex value as is (07C0 is default), but change the number of loaded sectors to four (default is one). Click on New, rename the ISO name from New to WXPVOL_EN, drag the entire structure within C:\XPCD across and burn away.

It's best to burn the CD to a CD/RW — this way you can easily update the customised distribution. Save the compilation and it's ready for the next round of driver and security updates.

## this month


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*Patrick Kirsch* demonstrates how to give your PC a silence makeover.

**110 Mastering Networking, part 3**
*Stephen Withers* outlines the functions and setup of routers.

**113 Handhelds PDA as a laptop**
*Anthony Caruana* accessorises PDAs to replace laptops.

**114 Mastering PHP and MySQL, part 1**
*Lucas Hale* builds a database-driven Web application.

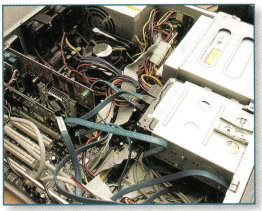
**116 Mastering Linux, part 11**
*Jarrod Spiga* customises the X-Windows desktop and delves deeper into scripting.

**120 Networking Solaris**
*Brendan Gregg* explains patching and package updates.


All code fragments and examples given in Workshop articles are for demonstration purposes only. Questions or comments? Email workshop@apcmag.com.

# Quiet the riot

**In the first instalment of *APC*'s series on building your own home theatre PC, *Patrick Kirsch* explains how to keep things quiet and cool.**



**The original configuration: a maze of cables hampering the airflow from too many fans.**

If you want to turn an existing PC into a home theatre PC (HTPC) for DVD, MP3 or high-definition digital TV playback, the last thing you want is the machine adding 50dB of noise to the environment. Rather than ditching the whole box and shelling out for a purpose-built "quiet PC", how do you attain the magic 32dB of barely audible noise? (See "How loud did you say?", top right.) Efficient cooling is the answer and, as you will see, many decibels of noise can be shaved off for less than $200.

**Skill level**

Beginner

**Requirements**

Needle nose pliers.

**Time to complete**

2 hours (approx)

## A few dollars more

**The tips on this page aren't intended for gamers and overclockers. If you have a speed beast, it'll take a few extra steps and dollars to silence it.**

- **Acoustically insulating the inside of the PC shouldn't be your highest priority, although some dense neoprene feet are helpful and only cost a few dollars.**
- **Acoustic isolation, like putting your PC in a cupboard, is probably not going to be practical, but muffling sound with furniture is worth a try.**
- **Fanless power supplies are expensive. Instead, use an efficient power supply with a 12-14cm fan located beneath the unit — it will be quiet and reduce the need for extra case fans. Street price from about $100.**
- **Replace any motherboard chipset fans with a heatsink like the Zalman NB47-J. Street price about $12.**
- **Liquid CPU cooling systems are very quiet and start at about $200.**

### THE VICTIM

The machine used in this Workshop currently functions as a HTPC, in conjunction with a Panasonic AE500 LCD projector with a rated noise level of 32dB(A). It sports a 2.8GHz Pentium 4 (533MHz FSB) and a Radeon 9600 video card on an AOpen P4E Max motherboard. There are also three hard drives: a Seagate Barracuda 7200.7 ATA and two Western Digital Caviar SATAs in a RAID configuration, plus two DVD-RW drives.

All of this is packed into a CoolerMaster Cavalier 2 desktop case. This case is designed for HTPC use, yet in its present state the machine is very loud. When a sound pressure level (SPL) meter was pointed at it from one metre away in quiet ambient conditions, the noise just registered at the bottom of the scale at 50dB(A). This makes it easily audible in quieter movie or music passages. This Workshop's aim is to reduce the system's noise level to around 32dB(A).

### THE PRIME SUSPECTS

Start by identifying which parts of the machine produce the most noise, and address them in order. This list should hold true in most instances:

- Power supply fan
- CPU cooler
- Video card fan
- Case fans
- Motherboard chipset fan
- Hard drive motors and heads
- Optical drives
- Case panel vibrations caused by any of the above
- Vibration transmitted through case feet

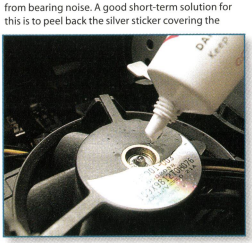
**1** In this case, the high-pitched whine from the power supply fan indicates the bearings are worn and drowns out all the other noise sources in the case. A transplant with a new 80mm quiet fan, like a Papst 8412 NGML generating only 19dB(A) costs around $20 (other brands to look for are SilenX and Panaflow). While you're at it, remounting the fan on rubber grommets ($1) will help reduce noise from vibration.

The type of grille in the image (below left) actually impedes air flow and causes turbulence noise. If this was an external vent, it could be cut out and replaced with a wire grille, available from most electronics stores for a few dollars. However, as this is an internal one, it can be safely removed and left open.

**2** The CPU cooler in this machine is an ageing Intel Pentium 4 heatsink and fan, also suffering from bearing noise. A good short-term solution for this is to peel back the silver sticker covering the



**1** **Rubber grommets will acoustically isolate a fan from the chassis to further reduce noise.**



**2** **A drop of light machine oil in the hub of an aging fan can temporarily reduce noise levels.**

hub and add a few drops of a light machine oil, like those supplied with hair clippers. This will reduce the noise for some time. A better but more costly solution is a quiet CPU cooler like the Zalman CNPS7000B (street price around $65). It has a manual speed control that can be externally mounted on the PC case, giving you a range of noise levels from an acceptable 27.5dB(A) to an inaudible 18dB(A).

Don't put your system at risk just for the sake of silence. The target of 32dB(A) must be matched by a maximum CPU temperature of 68˚C and an idle case temperature of less than 38˚C (as recommended by Intel for this CPU). Adding a tube of Arctic Silver 5 thermal compound for $10 will maximise the cooling ability of the all-copper heat sink.

Another trick, which takes an extra degree or two off the CPU temperature, is called "lapping". Polish the surface of the heat sink in contact with the CPU with very fine-grade emery paper. The "Temperature readings" table below shows the heat levels for both CPU and system during this makeover.

### KEEP IT MOVING

The top left image shows the internals of the system are tangled with cables that seriously impede air flow. The solution is to create an air channel from the front intake, across the hot components and out through the power supply.

3 Cleaning up the power and hard drive cables effectively reduces temperatures. Try to use the shortest possible cables to do the job and employ a few cable ties to hold things in place. In this system, the ATA ribbon to the DVD drives was replaced with a round cable costing $15, and a little origami was performed on the other to reduce its air resistance.

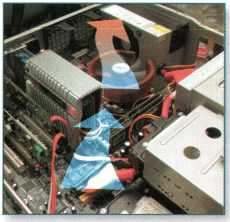
The passage of time wears down bearings and causes the build-up of dust. This clogs up vents, reduces airflow and prevents heat sinks from working effectively. Use a can of compressed air ($16) to blow away all those dust bunnies in your system. Never use a vacuum cleaner; the static will fry your CPU. Any air filters over intakes should be removed as they also block airflow, and regular cleanups are imperative.

### NOISY VIDEO

With the worst noisemakers gone, the high-pitched whir of the tiny video card fan suddenly becomes painfully obvious. A 0dB solution in the form of a fanless video cooler will cost you around $50. They use large aluminium heat sinks with copper heatpipes to cool the chip. It is also advisable to leave at least a one-slot gap next to the video card to allow air to circulate.

### FAN CLUB

This system has a total of three case fans, one



**3 Airflow within the system is now unimpeded by cables and wires.**

80mm intake at the front and two 60mm exhaust fans. The small fans are especially loud, as they must generally spin faster in order to shift the same amount of air. Remove them completely.

To control airflow, seal up any unwanted gaps in the chassis. Replace any missing backplanes from vacated PCI slots and cover up unused fan vents with duct tape.

The remaining case fan could also be replaced with a Papst 80mm to reduce noise. To save money, you can rewire it to use 7V rather than the usual 12V. Molex power connectors in PCs are wired with +12V (yellow), +5V (red) and 0V (black). By connecting your fan across the +12V and +5V rails, you will get a potential difference (voltage) of seven. Make sure to connect the positive wire of your fan (usually red) to +12V. Your fan will run much slower — and hence quieter — but with reduced airflow. Remount it with rubber grommets to further reduce noise.

### DRIVES

Modern hard drives, like those in this system, are almost silent but do generate a lot of heat. When installing drives, leave gaps around them, and make sure they are in the path of some airflow. Thankfully optical drives spin slowly for DVD movie playback.

## How loud did you say?

**Most people have heard (no pun intended) of the all-pervading unit of audio measurement: the decibel (dB). But few understand its real-world meaning. In this Workshop, the levels referred to are sound pressure levels (SPL), which are indicated by the unit dB(A) for adjusted measurements made with an A weighting — approximating the frequency response of the human ear.**

**The dB scale is logarithmic, so a doubling of sound energy results in a 3dB increase. Ten times the power: 10dB. One hundred times the power: 20dB. The human ear perceives loudness in a similar way. A 1dB increases is the smallest increment in loudness that a person will actually register. To double the perceived loudness, a 10dB increase is required. In terms of the quiet PC, if you take one 25dB(A) fan and add another one, you will get a total of 28dB(A) — an increase of 3dB(A), which is barely noticeable.**

**So how loud is 32dB anyway? The THX standard for home theatre "quietness" is 22dB, but an average suburban cinema would be around 32dB — not counting the rustling of chip packets.**

Case panel vibration should be negligible now, as all the fans are quiet and isolated as much as possible. Make sure to replace and tighten all case screws.

### RESULT

*APC* used SpeedFan 4.2 (**www.almico.com/speedfan.php**) to measure temperatures and fan speeds. Idling, the system was well within tolerance, as shown in the table below. A full length movie was played from DVD with the Zalman fan set to silent mode. Finally, a CPU-intensive DivX render was run with the Zalman at its highest speed. Again, plenty of thermal headroom.

Using the Panasonic projector (32dB(A)) as reference, a subjective listening test indicated the PC was just barely louder than the projector. This puts it in the 32-35dB(A) area.

## Temperature readings (ambient: 21˚C)

| Stage | Activity | CPU ˚C | System ˚C |
|---|---|---|---|
| Initial | idle | 52.5 | 42 |
| Arctic Silver/Zalman CPU fan (low speed) | idle | 42.5 | 42 |
| Cable tidy/clean | idle | 41 | 38 |
| Replace case fans | idle | 39 | 38 |
| Low CPU fan speed | DVD playback | 47 | 47 |
| High CPU fan speed | DivX render | 52 | 45 |

**Successive stages showed incremental improvements in temperature, with home theatre mode (highlighted) warm but comfortable.**

# Mastering networking, part 3

***Stephen Withers* outlines the function and setup of the type of router commonly used in small networks.**

**Skill level**
Beginner to intermediate

**Requirements**
(W)LAN • router.

**Time to complete**
One hour (approx)

**In this series . . .**

**Part 1 — August '05**
Basic setup

**Part 2 — September '05**
Wireless LAN

**Part 3 — October '05**
Router setup

**Part 4 — November '05**
Connecting handhelds

**. . . and more**

If you want to share a connection with several computers or devices, you'll need a router to direct traffic between the two networks.

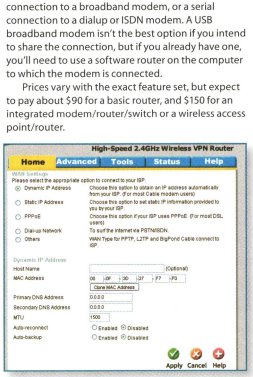
In this context, one of them is the LAN and the other is the Internet. Key features of home and SOHO routers are DHCP and NAT. DHCP allows the router to provide each computer with an IP address and other settings needed to access the Internet. Most Internet plans only entitle you to one IP address, so the router has to direct traffic for that address to the appropriate computer. When one computer's browser requests a Web page, Network Address Translation (NAT) ensures that the HTML and other files are directed back to that same computer, even though the rest of the Internet sees your LAN as a single IP address.

Windows' Internet Connection Sharing feature is an example of a software-based router. Linux and Mac OS X have similar features, and you can find software routers for older systems. The drawback is that you only get Internet connectivity for the second and subsequent systems when the primary computer is running.

From here on, this Workshop will discuss "hardware routers", which allow each computer to operate independently.

Almost all routers are designed for an Ethernet connection to a broadband modem, or a serial connection to a dialup or ISDN modem. A USB broadband modem isn't the best option if you intend to share the connection, but if you already have one, you'll need to use a software router on the computer to which the modem is connected.

Prices vary with the exact feature set, but expect to pay about $90 for a basic router, and $150 for an integrated modem/router/switch or a wireless access point/router.




**1** **WAN interface setup is a crucial step. If you have an ADSL connection, you'll probably need PPPoE.**

The exact setup of a router (whether standalone or integrated with an access point or switch) varies by manufacturer and model, so follow the instructions. *APC* recommends setting up a wireless router via an Ethernet interface if possible, as it reduces the likelihood of becoming disconnected due to misconfiguration.

The router used for this Workshop was a D-Link DI-824VUP+ wireless unit. Most SOHO routers are configured via a Web interface, so once the physical installation is complete and you've configured the computer to use DHCP (see "DHCP", right), type the default IP address for the router into your browser. In this case, it's 192.168.0.1.

**1** Setting up the WAN interface is a crucial step — if the router doesn't know how it's supposed to talk to your Internet connection, it'll probably get it wrong.

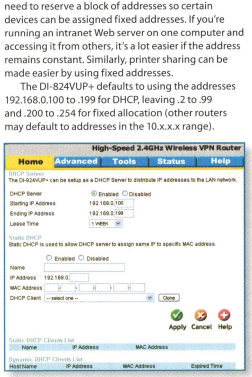
If you have an ADSL connection, you'll probably need PPPoE (Point to Point Protocol over Ethernet). You'll have to enter your broadband account's username and password, and select either static or dynamic addressing.

For OptusNet Cable, select Dynamic IP Address.

BigPond Cable needs special treatment, so check that the router supports the Internet service before you buy. With the DI-824VUP+ select Others, and additional choices — including BigPond Cable — will appear.

**2** For most small networks, the default DHCP setup will normally suffice. The only issue is whether you need to reserve a block of addresses so certain devices can be assigned fixed addresses. If you're running an intranet Web server on one computer and accessing it from others, it's a lot easier if the address remains constant. Similarly, printer sharing can be made easier by using fixed addresses.

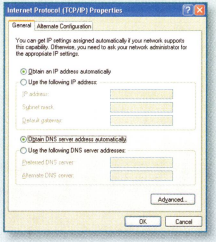
The DI-824VUP+ defaults to using the addresses 192.168.0.100 to .199 for DHCP, leaving .2 to .99 and .200 to .254 for fixed allocation (other routers may default to addresses in the 10.x.x.x range).

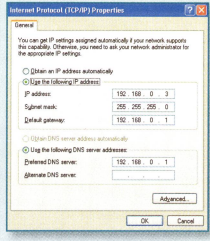



**2** **Situations like printer serving are made easier if a fixed address is used.**

## DHCP




**By default, Windows configures itself using DHCP. To change the settings, open the Network Connections control panel, right click on the relevant connection and select Properties. Scroll down to and select Internet Protocol (TCP/IP), and click Properties (see above image).**

**For configuration via DHCP, click the Obtain an IP address automatically and Obtain DNS server address automatically buttons (see middle image).**

**To change to a fixed IP address, click the Use the following IP address button and type in an IP address that's not being allocated by the DHCP server. The router in the example leaves 192.168.0.2 to .99 free, and 192.168.0.3 was used. You must keep track of the fixed IP addresses you have allocated to different computers, as you can't have two computers with the same address. Only use fixed addresses if you need to know that a certain computer is always at a particular address.**

**You'll also need to enter the subnet mask (255.255.255.0 for a 192.168.x.x network), the default gateway (the router's IP address) and DNS server address (the router's address usually works in a small LAN).**

**Click the OK button to finish up.**

**Things stay a lot simpler if you can tell the router to allocate a fixed address to the computer based on its MAC, and leave the PC set to Obtain an IP address automatically. If your router has that capability, use it (see image above right).**

There are two ways of setting up these fixed addresses. You can configure the computer, or other device, to use a fixed address (see "DHCP", above). This will work with any router that lets you limit the address range used by DHCP. The alternative is to tell the router to reserve IP addresses for particular computers, which it identifies by their MAC (medium access control) addresses. However, this method is only available on some routers.

Click the Enabled button in the Static DHCP section of the Web page, select the computer from the DHCP Client pop-up menu, and then click the Clone button to copy its details into the form. Hit the Apply button, and that computer will always give its current IP address.

While the Web interface of the DI-824VUP+ displays the MAC addresses of connected computers, other routers may need you to obtain this information.

You can find a Windows PC's MAC address by opening a command prompt window and typing ipconfig/all — the MAC address is shown as the Physical Address.

In Mac OS X, look in the Network system preference and select the Ethernet or AirPort interface from the Show pop-up menu. The MAC address is shown as the Ethernet ID in the Ethernet tab, or the AirPort ID in the AirPort tab.

Some routers can restrict Internet access according to MAC address white lists or blacklists. A MAC address is supposed to uniquely identify a network interface. This makes it seem like a good feature for wireless networks, as it appears to ensure that the next door neighbour can't piggyback on your broadband connection.

Unfortunately, intruders can determine an acceptable MAC by listening to your traffic and then clone that into their wireless card. In short, MAC filtering helps keep casual snoopers at bay, but is no protection against determined intruders.

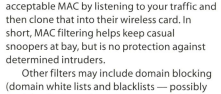
Other filters may include domain blocking (domain white lists and blacklists — possibly useful to limit employees' or young children's browsing), URL blocking (on the basis of keywords), and port blocking (to limit the use of certain services to particular times or ban them completely).

A few routers include a modem port for dialup if your broadband connection fails.

This might be important if you rely on Internet access, but you might want to consider using different ISPs for broadband and dialup to provide greater redundancy. If you're on ADSL (or you use OptusNet cable for Internet and telephony), even this won't help if the line is damaged between your premises and the exchange.

If you run out of Ethernet ports on the router, you can connect an ordinary switch to one port, using a crossover cable unless at least one of the switches has an uplink port or is equipped with Auto MDI/MDIX ports.

After connecting a multi-port router and a switch, think about which devices should be connected where. For example, if there's going to be a lot of traffic between two devices (e.g., the frequent transfer of large video files between two PCs) try to plug them both into the same switch as this will give the best performance and have the least impact on the rest of the network. ETTE



**An ageing single-port Farallon router connected to a ten-port Asante switch. Note the use of the uplink port and a normal patch-cable.**

### Next month . . .

**The next instalment in this series will look at transferring information to and from PDAs and other handheld devices.**



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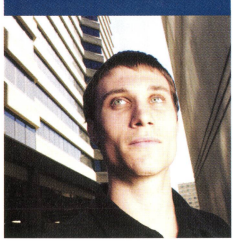
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# The smallest laptop

**The promise of the PDA was to replace the luggable laptop.**

***Anthony Caruana* helps you make this dream a reality.**



On the cover DVD

APC

## Bonus DVD software

**Nyditot Virtual Display Version 4.04.**

## Skill level

**Intermediate**

## Requirements

**PDA (preferably with Bluetooth, Wi-Fi and support for landscape screen orientation)**
- **portable keyboard**
- **mouse.**

## Time to complete

**1 – 2 hours**

If the modern PDA could be summed up in a single word, it would be "promise". Hardware makers said they'd deliver super-powerful, pocket-sized computers with glorious colour screens, massive storage and power to burn. Although much of that promise has been kept, you'll still need to supplement your PDA with some software and accessories.

If you're running a current Pocket PC or Palm, some of the pieces are already in place. Toggling the screen to landscape orientation is great for reading documents and spreadsheets, as its wider aspect reduces the need for side-scrolling. Older Pocket PCs can have this capability with a software utility. Nyditot (on this month's cover DVD) lets you toggle orientation on devices running Windows Mobile 2003 (pre-Second Edition) and older. It can also change the resolution of your screen by interpolating pixels, but this makes text harder to read.

When shopping for a new handheld, look for a device with a high-resolution display. Current Palms, like the Tungsten T5 and LifeDrive ($599 and $899 respectively; **www.palm.com/au**) run at half VGA (320 x 480) and Pocket PCs such as the Dell Axim X50v ($686; **www.dell.com.au**) and HP iPaq hx4700 ($799; **www.hp.com.au**) run at full VGA (480 x 640).

One of the biggest advantages of notebooks over PDAs is text input. While handwriting recognition and soft keyboards are okay, nothing beats a real keyboard. A wireless unit like the above Think Outside Bluetooth Stowaway ($199; **www.ow.com.au**) is ultra-portable and only slightly larger than a PDA when folded. The advantage of a Bluetooth unit is that it lets you put the PDA in a position that's comfortable for you, rather than relying on line of sight for infra-red or a specific connector. It also has the advantage of being non-PDA-specific, so you won't need a new keyboard when upgrading.

Before installing a device like this, it's a good idea to check for the latest drivers. When APC installed the supplied driver for this keyboard to a Pocket PC, it caused some instability. To solve it, the driver had to removed and replaced with the latest one from the Web.

For a PC-like experience you'll also need a mouse. Again, Think Outside makes a portable Bluetooth mouse ($99) but this only works with Pocket PCs. Once that's set up, you've got a hardware solution that can fit into a couple of pockets.

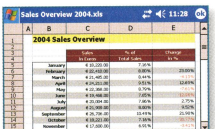
To beef up the office-productivity applications, Pocket PC users should consider SoftMaker's office suite of TextMaker and PlanMaker (US$49.95 each; **www.softmaker.com**). TextMaker is a fully-fledged word processor that can open and work seamlessly with Microsoft Word documents. You'll need about 8MB for its installation, but it's worth it if you frequently use Word documents. PlanMaker offers full spreadsheet functionality, including charts and images with complete Microsoft Excel compliance. Versions are also available for other platforms including Windows, Linux and Symbian.

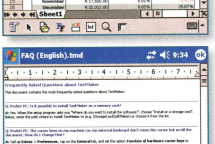
Palm users are a spoilt bunch. Documents To Go (from US$29.95; **www.dataviz.com**) ships with most Palm handhelds, and allows viewing and editing of Microsoft Word and Excel documents. The Professional Edition also supports PowerPoint.

For PDF reading, Adobe Acrobat Reader (Free; **www.adobe.com.au**) is available for both Pocket PC and Palm. Westtek also makes the ClearVue PDF viewer that ships with some Pocket PCs, otherwise it's a US$8.95 download (**www.westtek.com/pocketpc/pdf**).

To stay connected while travelling, you can use any hotspot Wi-Fi connection, a Bluetooth connection to your mobile phone with GPRS, EVDO, EDGE, or some other wireless Internet connection.

If you want hard copies, there are many portable printers with wireless comms on the market, such as infrared and Bluetooth. Units like the $449 Canon PIXMA iP90 (see APC August, page 40) or the $516 HP Deskjet 450 let you print in colour using a Bluetooth connection. And since they both run on battery packs, you can use them almost anywhere.




**SoftMaker's apps make it a breeze to work with your office documents while you're on the road.**

**Sure the specs are a little retro but carrying a VGA, 600MHz and 64MB of RAM PC in your pocket was a pipedream until recently.**

## Next month . . .

**How to use your PDA to deliver PowerPoint presentations.**

# Mastering PHP and MySQL, part 1

**In this first instalment of a brand new series, *Lucas Hale* shows how to build a database-driven Web application using PHP and MySQL.**

On the cover DVD

## Bonus DVD software

**Apache 1.3.33 • HAPedit text editor 3.1.11.111 • MySQL 4.1 • PHP 4.4 • PHP CHM help file • PHPMyAdmin 2.6.3-pl1 • PHP sample pages.**

## Skill level

**Beginner**

## Requirements

**MySQL database running on Windows • Web server with PHP installed and configured • Web browser.**

## Time to complete

**1 hour**

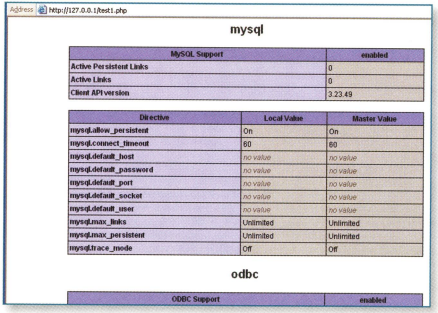
Portable and multi-user accessible, Web-based applications are being utilised by many large companies, such as Hotmail, NetBank and Seek. These solutions are very flexible as the only requirement for the client is a Web browser — so a single application can be used from phones, PDAs, Windows, Linux and OS X.

But Web-based apps aren't just for big businesses and can be put to good use in the home. This Workshop demonstrates how to create an application with the PHP language and MySQL database to catalogue your DVD collection and access it from any Web-enabled device in your house. This is just a sample app but the basic concepts shown here can be built upon to create more advanced applications.

### WHAT IS PHP?

HyperText Preprocessor or PHP started life as a set of simple scripts to help the original author maintain his personal home page. Since then, PHP has become one of the most widely used server-side scripting languages in the world. Server-side scripting means that the PHP code is executed on the Web server rather than on the client, like applets and JScript.

Generally, PHP code is embedded in an HTML document. When a browser requests the page, the document is first parsed by the PHP module installed on the server, and any embedded PHP code is executed before the output is inserted back into the document and the information is sent to the browser.




**1** **If the MySQL module is correctly configured, you will be able to see the details in the MySQL section of the test page.**

### A SIMPLE EXAMPLE

The following is an HTML document with embedded PHP code:

```
<HTM>
<BODY>
An HTML Document<BR>
<?php echo "PHP CODE: Hello World" ?>
</BODY>
</HTML>
```

When a browser requests this page the following will be sent by the server:

```
<HTM>
<BODY>
An HTML Document<BR>
PHP CODE: Hello World
</BODY>
</HTML>
```

The PHP inside the <?php ?> tag is executed and the echoed text is inserted in its place. Although this concept is very simple, it can be used to create powerful applications. The syntax is based on C, Java and Perl, and is easy to learn.

### SO HOW IS PHP USED?

The most common scenario is that the PHP is linked with a database to deliver a dynamic database-driven Web site. Turning the information from the database into a Web page generally requires some scripts to transform and manipulate it into the desired format, and PHP is ideal for this application.

### WHAT IS A DATABASE?

The simplest description for a database is an information storage and retrieval system. It consists of records and each record consists of one or more fields. A field is a logical breakdown of the information in a record. For example, an address-book database would have a record for each person and each record would be made up of fields like first name, surname, work phone, email and so on.

| Person |
|---|
| First name |
| Last Name |
| Work phone number |
| Email |
| ... |

### WHICH DATABASE TO USE WITH PHP?

The most common databases used for Web applications are called relational databases, where the data is stored in tables of rows that are linked together. For example, the address-book database might have a table with a row for each state in Australia and the State field in the address table would point to the correct row in the State table.




Some common databases used in modern Web applications are Microsoft's MSSQL and Access, Oracle, PostgreSQL and MySQL. PHP has interfaces to all of these databases, along with a large selection of less common ones, so you are able to use any of these in your application.

### L.A.M.P., W.I.M.P. AND W.A.M.P.

L.A.M.P. (Linux, Apache, MySQL and PHP) is becoming the standard Web application platform in open source communities, but in the corporate world W.I.M.P. (Windows, Internet Information Services, MySQL and PHP) is making an impact as it can be used on existing Microsoft servers.

This Workshop uses W.A.M.P. (Windows XP, Apache 1.3, MySQL 4 and PHP 4) because three of the packages are free, and the fourth is the most common desktop OS. The great thing about PHP is that the code is portable, so the same programs will work on Linux, Solaris, OS X and any other platform supported by PHP. Once the packages are installed and configured (generally in the order of database, Web server then PHP) you're ready to start.

To test the PHP configuration, create a file in the DocumentRoot of the Web server. For Apache on Windows the default path is C:\Program Files\Apache Group\Apache\htdocs\.

Name the file test1.php, open it with a text editor and add the following lines:

```
<?php
phpinfo();
?>
```

Now open a Web browser and enter the URL of the server and test page (e.g., **http://127.0.0.1/test1.php**).

**1** If everything is installed and configured correctly, a PHP information page showing the current configuration of the PHP module should appear. If the MySQL module is configured you'll see the details in the MySQL section of the configuration page.

**2** Next create a file called test2.php and add the following lines:

```
<HTML>
<BODY>
A HTML Document<BR>
<?php echo "PHP CODE: Hello World" ?>
</BODY>
</HTML>
```

View the page at **http://127.0.0.1/test2.php** and the HTML output will be the same as that shown in "A simple example".

To connect to the MySQL server and display some basic information about it, create a file called test3.php and add:

```
<HTML>
<BODY>
A List of Databases on Server<BR>
<?php
// Connect to MySQL server
// Username is root and password is blank
$link = mysql_connect("127.0.0.1","root");
// List the databases on server
$db = mysql_list_dbs($link);
// echo the name of each database followed by a <BR>
while ($row = mysql_fetch_object($db))
{
echo "<B>".$row->Database."</B><BR/>";
}
echo mysql_stat($link)."<BR/>";
?>
Done
</BODY>
</HTML>
```

The mysql_connect() function takes four arguments, but they are all optional. If they aren't specified, PHP will use the defaults from the configuration file. The IP address of the MySQL server has been specified and the username was configured during the installation. The password is blank so one wasn't specified — a blank password is the default in the configuration file. This function returns a MySQL link identifier if it's successful.

The returned $link is then used as the argument to the next function mysql_list_dbs() which will return a result pointer $db containing the databases available on the MySQL server.

The returned pointer $db is passed to mysql_fetch_object() and returns one row at a time as an object. The member Database of $row is then echoed for each row. When there are no more rows, mysql_fetch_object() will return FALSE and the loop will end.

The last function mysql_stat() will return a string of the current MySQL server status. This string is then echoed, followed by a line break <BR/>. Note that . was used o join strings together and // was used for comments.

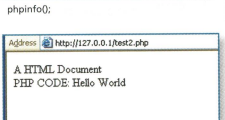
**3** The script will display a page listing the databases on the server and its current status. EOT

## Inside info

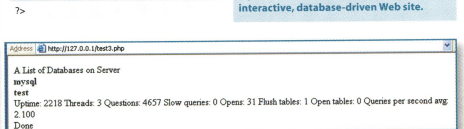
- Apache 1.3
  **http://httpd.apache.org/download.cgi**
- MySQL 4.1
  **http://dev.mysql.com/downloads/mysql/4.1.html**
- PHP 4.4
  **www.php.net/downloads.php**

## Next month . . .

**The next instalment of this series will use MySQL from PHP to build a dynamic, interactive, database-driven Web site.**




**2** **Now create a second test page, enter the code and view it at *http://127.0.0.1/test2.php*.**




**3** **Some simple coding lets you connect to the MySQL server. Then use your browser to go to *http://127.0.0.1/test3.php* and view the current status of the databases on the server.**

# Mastering Linux, part 11

**In this month's instalment of the Mastering Linux series, *Jarrod Spiga* delves deeper into scripting and shows you how to customise the X-Windows desktop.**

On the cover DVD

**Bonus DVD software**

PDFs of every instalment of the Mastering Linux series.

**Skill level**

Intermediate

**Requirements**

An installation of Linux (Fedora Core 3 was used in the writing of this article).

**Time to complete**

2 hours

**In this series . . .**

Part 10 — September '05 Mastering the shell

Part 11 — October '05 Scripting and customisation

Part 12 — November '05 Systems administration

. . . and more

The scripting methods demonstrated in last month's instalment of the Mastering Linux series are fine if you need to execute commands in a strictly linear fashion. What wasn't shown was how to use control structures and conditional statements to alter the behaviour of your script under certain circumstances.

### IF THEN ELSE

The if-then-else control structure will be familiar to anyone who has done any kind of programming or scripting. Shell scripts also support this most basic of control structures. Broken down, this control structure executes certain commands if a condition is true, otherwise it executes another set of commands:

```
if [ $CONDITION = alpha ]; then

echo "This code is executed if $CONDITION is identical to alpha."

elif [ $CONDITION = beta ]; then

echo "This code is executed if $CONDITION is identical to beta."

else

echo "This code is executed if $CONDITION is neither alpha or beta."

fi
```

This example shows how if-then-else structures work. Note the location of the brackets ([]), which are there to tell the shell what the test expression is. They also stop the shell from assigning the test value to the variable. Also note the required semi-colon (;) after the test expression.

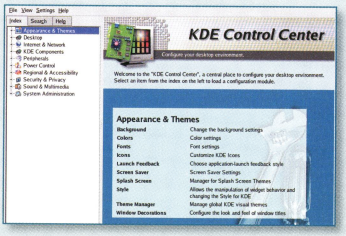
The test expression is not strictly limited to "identical" comparisons. The table below shows some of the other expressions that are frequently used:

| Expression | Definition |
|---|---|
| x = y | True if the text value of x is identical to the text value of y |
| x != y | True if the text value of x is not identical to the text value of y |
| x -gt y | True if the numeric value of x is greater than the numeric value of y |
| x -lt y | True if the numeric value of x is lesser than the numeric value of y |

## Customising the desktop

By now, you've probably customised the way your desktop looks and behaves. After all, the default settings won't suit the way everyone wants to use their Linux systems.

Some degree of customisation is required in order for you to work more efficiently within X-Windows — and it doesn't hurt to jazz up the look of things while you're at it.




**1** **The KDE Control Center is the one-stop shop for all of your settings customisations.**

If you use GNOME, most of the settings for your desktop can be found under the GNOME > Preferences menu. From KDE, click KDE > Control Center.

1 Instead of displaying your options in a menu, KDE's Control Center has an expandable tree that contains all of your customisation options.

### WINDOW APPEARANCE

One of the quickest ways to make a drastic alteration to the look of your desktop is to change the theme that's currently being applied to the Window Manager.

The theme preferences dialog can be brought up by double-clicking on the Theme icon in GNOME's Control Center, or under Appearance and Themes > Window Decorations if you're using KDE.

| | |
|---|---|
| x -eq y | True if the numeric value of x is equal to the numeric value of y |
| -e value | True if a filesystem object by the name of value exists |
| -f value | True if a file by the name of value exists (not a directory, link, etc) |
| -d value | True if a directory by the name of value exists |
| -x value | True if the file by the name of value has executable permissions |

The optional elif command can also be used to modify the test expression to check if it meets some different criteria and is an abbreviation of else-if.

Similarly, the else command is also optional and the code contained within this sub-structure will only be executed if no other test expression has been true.

You must include the fi command at the end of each structure, as this informs the shell that the structure is closed.

To make your script easier to read and debug, it's a good idea to use indents to separate sections of the control structure. This is especially necessary when you're working with multiple, nested if-then-else control structures.

Nested structures give you more control but get increasingly complicated to work with as your script grows — especially if you forget the fi command in one of your structures. It's usually more efficient to use case control structures.

## CASE BY CASE

The case control structure works by comparing many values to a variable. If a match is found, the set of commands in that branch of the structure are executed, and then the structure is terminated. If no match is found, the default case (if one exists) is assumed true. The case structure looks like the following:

```
case "$VALUE" in
'0')
echo "This is executed if $VALUE
is identical to 0";
;;
'1')
echo "This is executed if $VALUE
is identical to 1";
;;
*)
echo "This is executed as the default case if
no other test
holds true";
;;
esac
```

Case structures are ideal when writing a script that manages services or daemons. For instance, the following snippet of code will start or stop a daemon by calling one of two different scripts. It will also inform the user of the correct syntax for the script should the user enter incorrect arguments:

```
#!/bin/bash
case "$1" in
'start')
~/scripts/startup-script
;;
'stop')
~/scripts/shutdown-script
;;
*)
echo "Usage: $0 [start|stop]"
;;
esac
```

## AROUND IN LOOPS

The most basic of loop structures is the while loop. It's constructed in a similar manner to if-then-else, but it continues to loop through the list of commands in the structure while the test condition holds true:

```
while [ $CONDITION = true ]; do
echo "This code is executed in the while
loop."
# don't forget to include code that modifies
the value of $condition
```

A decent range of decorations is installed by default, and it's even possible to combine elements from a couple of different themes to display at once. This is fairly intuitive if you're using KDE — especially if you also browse through the various colour schemes under Appearance & Themes > Colors.

But if GNOME is your environment of choice, it gets a little tricky. It involves you selecting a base theme and then clicking on the Theme Details button. From there, you can choose different themes for your controls, window borders and icons.

If you can't find a theme that you truly like, head on over to **http://themes.freshmeat.net** and download some of the user-contributed ones. Installation instructions are usually supplied with each theme.

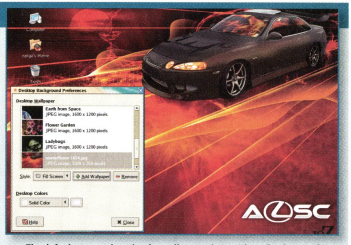
## WALLPAPER

2 Everyone likes to have their own desktop wallpaper displayed beneath their icons and windows.

If you're using GNOME, you can change your wallpaper by selecting Desktop Background. To select the background image of your choosing, click on the button underneath where it says Select Picture. You will then see the list of images stored at /usr/share/backgrounds/images, but it's pretty easy to navigate to the location where your desired background is stored.

In KDE, the settings are under Appearance & Themes > Background, and you can select your background image from under the Wallpaper tab. KDE also gives you the choice of setting a different wallpaper for each of the virtual desktops that are running — simply deselect the Common background checkbox.

You can also specify multiple wallpapers if you wish, and KDE will automatically change the background at a frequency that you can define under the Setup Multiple... button.




**2 The default storage location for wallpapers is /usr/share/background/images. But you can add images from other locations with the Add Wallpaper button.**

## RESOLUTIONS AND REFRESH

If you're using a CRT screen, you'll generally want to use the highest screen refresh rate

```
CONDITION = false
done
```

The comment line acts as an important reminder — if you don't include any code that modifies the test variable(s) within your while structure, the script will get stuck in the loop and continue to execute forever (or until you manually stop it). Using a nested if-then-else structure in the while structure is a good way to determine whether the test variables actually need changing or not.

### BREAK THE CIRCLE

Conditions will undoubtedly arise when you'll want to stop a portion of a loop from executing, or even stop the loop from processing altogether. The continue statement can be used to cause the loop to stop executing that iteration and proceed with the next. The break statement can be used to immediately terminate the loop.

The following commands should echo the numbers 1, 2 and 4 on the screen.

```
val = 0
while [ "$val" -lt 5 ]; do
val = $(($val+1))
if [ "$val" -eq 3 ]; then
continue
fi
echo -n "$val "
if [ "$val" -eq 4 ]; then
break
fi
done
```

The number 3 is not shown because the continue statement stops the loop from executing the echo command, forcing the loop to start processing the next iteration. The number 5 is not shown because the break statement terminates the processing of the loop before the while statement gets to terminate.

### WORKING WITH SETS

The third type of loop that you'll encounter in your shell-scripting endeavours is the for-do loop. This is used when you need to perform a number of commands for every element in a set and is ideal for performing operations on a group of files, such as:

```
for FILENAME in *.txt; do
echo "Now working on $FILENAME.."
tail -10 "$FILENAME"
done
```

When executed, the for statement assigns the first value in the set to the variable: in this case, the first .txt file is assigned to the FILENAME variable. The done statement lets the loop iterate, allowing for the next value to be assigned to the variable, and so forth until all of the values in the set have been processed.

And on a final note, there's absolutely no need to use a wildcard substitution in order to create your set in the for-do loop. As this example shows:

```
for FILENAME in 1.txt 2.txt 3.txt; do
```

you can specify each item in the set as you go along.

### Next month . . .

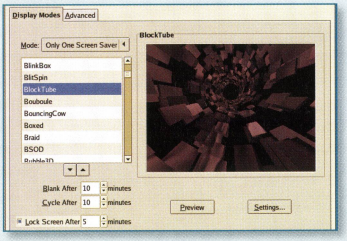
**Part 12 of the Mastering Linux series will cover Linux systems administration, focusing on how to manage various operations running on your Linux system. It will also explain how to check that system services and applications are functioning correctly.**

## Customising the desktop

setting the monitor can handle in order to minimise eye-strain while using your Linux system. If you're using an LCD screen, the resolution should be set to your screen's native resolution to achieve the best picture quality.

The Screen Resolution preference within the GNOME menu allows you to customise both of these settings. Under KDE, the same settings can be found under Desktop > Size & Orientation.

If you select an unsupported resolution and refresh-rate combination using GNOME, hit Enter after applying your settings to reset them. Under KDE, waiting 15 seconds will action the settings reset.




**3 For security reasons, it's generally wise to lock your screen shortly after the screensaver becomes active.**

### SCREENSAVERS

Both desktop environments include dozens of screensavers to choose from. While monitor burn-in is much less of a problem nowadays, your screensaver is useful for securing your system should you step away from it for a few minutes.

For instance, if you're logged in to an application using root credentials and you have to leave your system unattended, it's possible for anyone to use the resources on your system as the root user — even if they otherwise wouldn't have known the root password.

3 As a result, screensavers are often used to prevent other people from seeing what you're doing, and to lock the system when it's idle. In order to lock your system, ensure that the Lock Screen After or Require Password to Stop option is set (depending on your environment).

The amount of time that you specify next to this option relates to the number of minutes you wish the screensaver to be active for before the screen is locked (the amount of idle time required before your screen will lock is the combination of Blank time, plus the Lock Screen time).

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his plan is available to residents of Zone A - refer to TPG website. *500 minutes free calls per month apply or the initial 12 month contract for calls to: Sydney, Melbourne, Brisbane, Adelaide, Canberra and Perth, excl. nobile calls. Free calls are calculated with a minimum call time of 10 minutes and thereafter in 1 minute ncrements. TPG will debit customer's credit card $20 for prepaid call credit to cover calls outside the free alls, e.g. international and mobile calls. ^$0 installation offer is valid for customers who sign up to an 12 nonth contract and purchase a 4 Port Voice Router from TPG. Total minimum cost over 12 months is $819.83 ncludes 4 Port Voice Router cost of $199.95 and $20 non-refundable pre paid call credit). #Monthly payment y Credit Card only. Full terms & conditions apply. See www.tpg.com.au/voip/ for details. For more information n other plans, please contact TPG. TPG Internet Pty Ltd ABN 15 068 383 737

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called patch clusters can be installed manually or automatically. You can also add signed patches and install Solaris updates.

Apart from patching, you can install extra software on your Solaris system. Some applications come with installers, while others need to be compiled. However, the majority of Solaris applications are bundled up as "software packages".

## PATCHING

Finding patches and adding them to Solaris is relatively easy; just go to **http://au.sunsolve.sun.com** (see the left side for Patches and Updates). The only difficulty is knowing which patch to add, what strategy to use and which patch type to download.

Sun has recently changed the way patches are made available. If you don't currently have a support contract, you can register for free and access security and driver patches (see right side of the SunSolve Web site for a Register link). If you do have a support contract (just about every enterprise does), you can log in and download patches. There are a variety of support contracts that may not be as expensive as you think — some people have basic support contracts for their Solaris 10 servers at home.

### Skill level

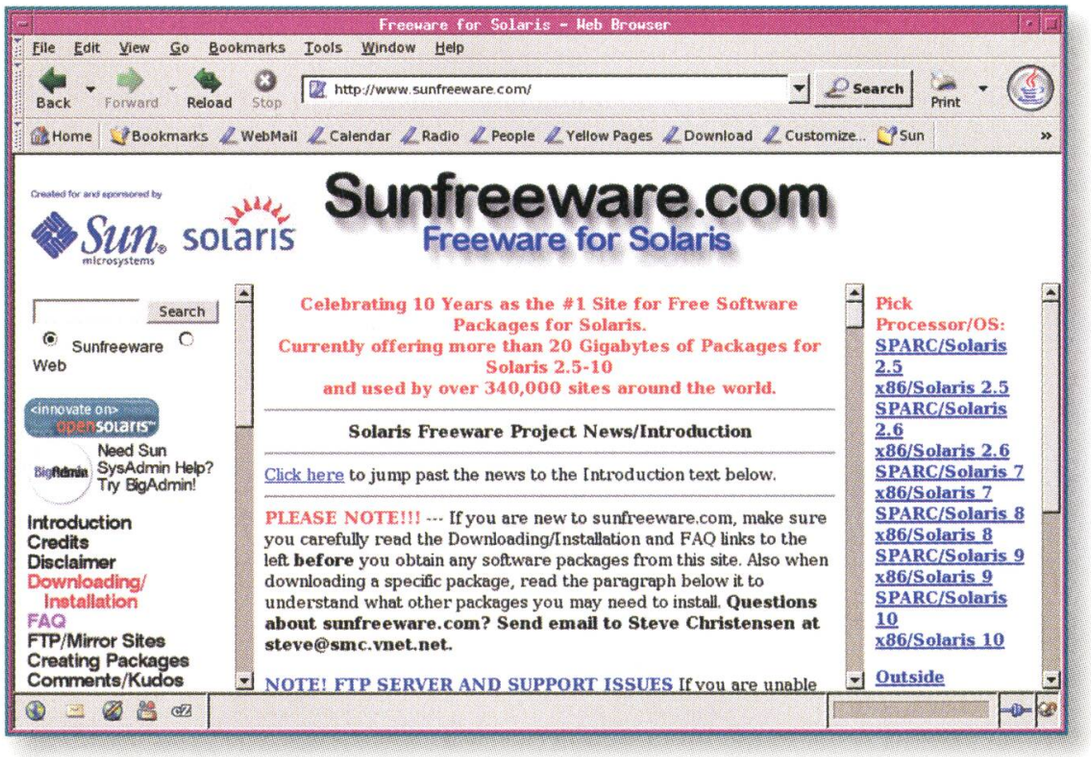
**Intermediate to advanced**

### Requirements

**Solaris 10 (the full version was provided on the *APC* July cover DVD).**

### Time to complete

**2 hours (approx)**




**1** **Sunfreeware.com is a faithful repository of packages.**

effectively upgrading to a fully-patched version of Solaris for free. The downside is that you are waiting for the updates to be released rather than getting patches immediately, and upgrading is time-consuming (something that Solaris 10's Live Upgrade can make less painful — see man live_upgrade for details).

Every environment is different. For Solaris 10 at home, you may be happy to install as many patches as you can. For a large enterprise environment, patches must be staged through testing and development environments, with each patch approved before addition. Although it's extremely rare, Sun has released patches that have made things worse. However, they're usually quickly followed by updates.

An individual patch will usually repair one product, and filenames are usually something like 118567-01.zip. There are generally two reasons why you're installing an individual patch: you were told you to; or you found it while searching for a specific bug fix.

If you subscribe to a security mailing list such as AusCERT (**www.auscert.org.au**), you may receive emails telling you which patches to install.

Or, if Solaris' software misbehaves, you might head to SunSolve for an explanation (SunSolve has a useful Knowledgebase to search) and discover a patch. For example, to install the 118567-01 patch downloaded in /tmp, log in as root and use the code below. The unzipped files aren't necessary afterwards:

```
unzip 118567-01.zip
patchadd 118567-01
```

Patch clusters can be easier to use, as they contain all files to bring Solaris up-to-date — regardless of whether you have patched before or not. They have filenames such as 10_x86_Recommended.zip, and can be installed using:

```
unzip 10_x86_Recommended.zip
cd 10_x86_Recommended
./install_cluster
```

It helps to bring the system to a special maintenance mode first using either init S or svcadm milestone single-user, so that the system is quiet while installing patches. Then reboot the server: init 6. To find out

what patches you have installed on the system, use showrev -p.

A new way to patch Solaris 10 is to use the Sun Patch Manager, or smpatch — it can automatically analyse, download and install patches using an smpatch update command. However, many environments prefer stage patching rather than a fully-automated process. For other ways to run smpatch, see man smpatch or visit **http://docs.sun.com/app/docs/doc/817-1985** (the Basic Administration guide on the *APC* July cover DVD) chapters 18 and 19 for further details.

If you are concerned with security, signed patches are available on SunSolve. It requires some configuration on your Solaris server but ensures the patch you downloaded really came from Sun.

## COMPANION CD SOFTWARE

Most people go straight to the Web for Solaris software or freeware. However, Sun ships a bundle of the most popular freeware on a CD-ROM called the Software Companion CD, along with the regular CD-ROM packs. This should be your first stop for freeware as the software on the CD has been built to cooperate better with Solaris. You can't really trust what you download from the Internet unless you configure signature checks (it's quite rare but there have been instances of Solaris freeware being trojaned on cracked Web sites).

An ISO image of the companion CD is on the *APC* July cover DVD (sol-10-GA-x86-sofcomp-iso.iso). It's also available on the Sun Web site with the code CCD in the filename. The ISO can be burnt to a CD-ROM, put in the Solaris server, then installed using:

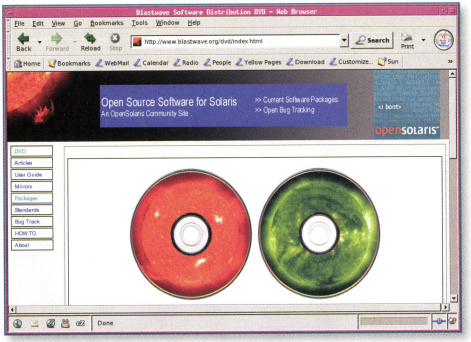
```
cd /cdrom/cdrom0
./installer
```

Another way to install the ISO image without burning it on a CD is by FTPing it to your Solaris server, then mounting it using lofiadm and mount. The process is complex, but if you are interested, see man lofiadm example one for details.

Log files will be created in /var/sadm/install/logs to describe what was installed — the Solaris_Software_Companion_CD_install.* log is the master list. By installing 150 software titles in one blow, it may take you a while to familiarise yourself with what has been installed. Type in pkginfo to see a list of the installed packages.

## SUNFREEWARE SOFTWARE

1 The 10-year-old **www.sunfreeware.com** Web site is run by Steven M. Christensen from North Carolina, USA. One of its Australian




**2 The Blastwave DVD is the safest way to keep Solaris up-to-date.**

mirrors is **http://sunfreeware.planetmirror.com.au**. The Downloading/Installation and FAQ links on the left side can be helpful, especially if things go wrong.

Sunfreeware.com has hundreds of free Solaris software packages, in categories for your Solaris version and architecture. Click x86/Solaris 10 on the right, then click on any of the names to load the centre panel and listing. Filenames that end in .tar.gz are usually source code that require compilation before installation. Most of the filenames that end in just .gz are package files.

For example, find the nedit package and download a file called nedit-5.4-sol10-intel-local.gz. The filename shows that it's nedit version 5.4, for Solaris 10, Intel architecture, and will install in /usr/local. Save the file to /tmp, login as root, and you can use the following to install it:

```
gunzip nedit-5.4-sol10-intel-local.gz
pkgadd -d nedit-5.4-sol10-intel-local
```

Some browsers can unzip a file but leave a .gz extension behind — and gunzip will complain when you try to unzip it. To find out what the file really is, run the File command on it.

Software that's downloaded from Sunfreeware.com often lists other software packages that also need to be installed before the package will work.

In addition to the free software on the companion CD (see "Companion CD software"), Sun has also shipped some Sunfreeware packages with the default install of the OS. It's been doing this since Solaris 9. To find them, look in the following directories in your Solaris installation: /usr/sfw/bin, /usr/sfw/lib; and /usr/sfw/include. The directories may already contain some of the free software that you need.

## BLASTWAVE SOFTWARE

2 Blastwave (**www.blastwave.org**) is another site containing Solaris freeware. It's run by Dennis Clarke of Ontario, Canada, and a community of Blastwave developers.

An app called pkg-get can be installed to automate the installation of packages and their dependencies. Go to **ww.blastwave.org/pkg-get.php** for the software and instructions.

You will need to edit an /opt/csw/etc/pkg-get.conf file to set up your environment. For fully automated installs, copy /var/pkg-get/admin-fullauto to /var/pkg-get/admin, which is the config file that controls the behaviour of how pkg-get processes dependencies. An example of the final command to download and install software is /opt/csw/bin/pkg-get install angband, which installs the angband package.

To improve security you can configure checksums and signature checks. But a safer way to get the Blastwave packages is to purchase a DVD (US$25). Aside from being inexpensive, buying a disc helps to support Blastwave's existence. EOTE



# Downtime

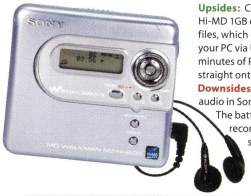
**High-performance playtime**

# Plug in to podcasting

**If you want to join the wave of people launching an online podcast, you'll quickly discover that your $19 PC-mic and motherboard sound won't give studio clarity. *Dan Warne* looks at reasonably priced alternatives.**

## Sony Hi-MD Walkman MZ-NH600

● **PRICE** $299 ● **ONLINE** www.sony.com.au ● **VERDICT** 2.5/5



**Upsides:** Can record audio onto Hi-MD 1GB discs in digital audio files, which can be transferred to your PC via USB. Also records 98 minutes of PCM WAV audio straight onto one $10 Hi-MD disc.
**Downsides:** Records compressed audio in Sony ATRAC3 format only. The battery life for PCM WAV recording is 2.5 hours. Tiny screen and non-intuitive interface; you'll need to read the manual first.

● **PRICE** $215 ● **ONLINE** www.iriver.com.au ● **VERDICT** 4/5



## iRiver T30

**microphone line-in so you can use a high-quality external mic with it. One GB of recording space. Also an MP3 player with support for MP3, OGG and WMA. Pocket-sized and only 27g.**
**Downsides: Recording bit rate only goes up to 128Kbit/s MP3, which for sound purists is still a bit too low. You have to get through a menu to activate recording mode.**

**Upsides: One of the few MP3 players that can do good quality voice recording directly into MP3 format, rather than a heavily-compressed proprietary voice recording codec. Has a**

## Edirol R1

● **PRICE** $895 ● **ONLINE** www.edirol.com.au ● **VERDICT** 4.5/5



**Upsides:** The Rolls Royce of digital voice-recorders. Uses the same PortalPlayer chipset found in the iPod with two very high-quality inbuilt microphones to record directly to a CompactFlash card of your choice — up to 4GB in capacity. The controls couldn't be easier, and the record button glows red while in use, a helpful basic reassurance. CD quality recording modes of up to 44.1KHz, 16-bit WAV files, or 320Kbit/s MP3 provide pristine sound.
**Downsides:** It's a professional tool with a professional price tag. But then again, iPods cost this much when they were new too. Could be smaller.

## Sony ECMDS70P

● **PRICE** $149 ● **ONLINE** www.sony.com.au ● **VERDICT** 3/5

**Upsides: Good quality stereo electret condenser microphone that plugs directly into portable recorders. Doesn't need external power or pre-amplification units as many microphones do. Doesn't have to be pointed directly at the subject. Good for recording two people at once.**
**Downsides: Picks up a fair bit of background noise (if ultra-portability is less of an issue for you, consider Sony's $219 cardioid microphone, ECMMS907).**



## Trillium telephone recording adaptor

● **PRICE** $99 ● **ONLINE** www.trillium.com.au ● **VERDICT** 4/5

**Upsides:** If you're doing a telephone interview for your podcast, there's no substitute for a quality telephone line recording adaptor. This sits between the line socket and your phone (or, another model works between the phone and the handset) and pipes the sound out to your PC or digital voice recorder. Ultra reliable and no background noise or hum introduced into the call.
**Downsides:** Expensive.



APC UBER Super cool | APC 1337 Very cool | APC NOOB Uncool

## Sunix multi-function port replicator with hubs

● **PRICE** $110 (inc delivery) ● **ONLINE** www.auspcmarket.com.au

**Upsides:** Not only a port replicator that brings your back ports to the front, it also includes inbuilt hubs. One USB 2.0 port on the back of your PC feeds three at the front, while one FireWire becomes two. Also replicates line-in, headphone and microphone ports. USB 2.0 card reader handles SmartMedia, Memory Stick, CompactFlash I & II, MMC and SD.

**Downsides:** Unusual double-height 5.25in form factor. Styling will appeal to, um, engineers.







## Navman GPS4420 Wireless GPS

● **PRICE** $529 ● **ONLINE** www.navman.com.au ● **VERDICT** 4.5/5

**Upsides:** This unit sends GPS data to your Windows Mobile PDA via Bluetooth. The SmartST 3.0 navigation PDA software comes loaded with WhereIS maps of all Australian street directories. You can plot routes favouring back streets or main streets and avoid suburbs. Maps can be displayed in 3D, and spoken instructions mean you don't have to take your eyes off the road. Integrates with your PDA contacts for navigation origins/destinations.

**Downsides:** Batteries only last for 30 hours and the unit doesn't recharge them (though it does come with a cigarette-lighter power adaptor).

## LaCie Mini 160GB

● **PRICE** $269 ● **ONLINE** www.lacie.com/au ● **VERDICT** 5/5

**Upsides:** Expand the piddly size of the Mac Mini hard drive by stacking yours on top of LaCie's Mini, which packs a hefty 7,200rpm 160GB 3.5in drive in a perfectly matching case. It comes in FireWire and Ethernet, and the FireWire one gives you an extra port for daisy-chaining other devices. Well priced.

**Downsides:** We wouldn't want to sow the bitter seeds of FUD, but we just hope Apple doesn't tweak the size of the Mac Mini in the next revision.







## AIPTEK PocketCam 5200

● **PRICE** $199 ● **ONLINE** www.capaxtech.com.au ● **VERDICT** 2/5

**Upsides:** It's all about value baby. A 5-megapixel digital camera with 640 x 480, 20fps video recording into Windows Media ASF format, an MP3 player and a Webcam (640 x 480 up to 30fps).

**Downsides:** You get what you pay for. It saves "5-megapixel" pics, but the actual sensor resolution is only 3-megapixels. Build quality feels cheap and plasticky, with "squidgy" buttons. No manual.

### MUGMOUSE

**Do you ever feel like your mouse has grown onto your hand like an unwanted appendage? Perhaps you need to splash out on a Mugmouse – a fully functioning coffee cup with a USB mouse built in (*www.iwk.dk/sloweb/new%20edition/slides/magmouse_slide1.htm*).**

**It encourages you to take a little time to sip and reflect on your work. We're doubtful that this will ever make it beyond the "art installation prototype" stage, but if it does, APC's liability insurance won't cover you if you accidentally tip Blend 43 into your $5,000 work notebook. You have been warned.**



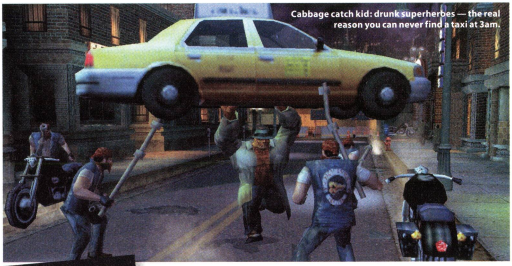
**Living in *Electric Dreams* has become a lot easier.**

### GET YOUR OWN BLOODY CONTROLLER

**Anti-violence lobby groups are in a buzz over this blood-spattered chainsaw game controller for the PlayStation 2 version of Resident Evil 4. It comes with a ripcord that makes a realistic revving sound, and when you wave it in the air, Leon, the crazed onscreen killer, follows your every move. This limited edition controller will be available from the end of this month for $109.95.**



**Gore-geous: this limited edition controller is, um, unique.**



Cabbage catch kid: drunk superheroes — the real reason you can never find a taxi at 3am.



Torch song: "We don't need no water, let the (bleep) (bleep) burn!"



Double eviction: Generic robots, you have 15 seconds to leave the house.

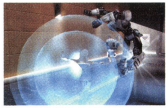


# Fantastic Four

**The review of the game of the film of the comic book. The verdict? *Justin Kranzl* reckons it's not so much "fantastic" as "alright".**

● CONTACT **Activision** ● ONLINE **www.activision.com.au** ● PRICE **$49.95** ● VERDICT **3.5/5**

● UPSIDES **The price, graphics and audio.** ● DOWNSIDES **Difficulty levels need a retune; can get a trifle repetitive.**



The game's difficulty levels are on the forgiving side of easy.



Mr Fantastic is actually a lot like the male version of Mrs Incredible.



The heroes spend more time punching on than using super powers.

In theory, any game or movie with Jessica Alba in it should be great. With Fantastic Four, good would be a better word.

It's arcade, it's fast and it's in trusty ISO 3D. Each of the titular four are playable and present in varying numbers depending on the situation. Each has their specialties — Invisible Woman (stealthy), The Thing (strong, ugly), Mr Fantastic (a lot like Mrs Incredible with his stretchy limbs) and the Human Torch (fiery, useless as a bartender).

They all can do mundane ass-kicking moves with their feet and hands, but because they're superheroes, they also have some cool special attacks and powers, which can be steadily upgraded throughout the game in a very RPG-lite style levelling element.

There are two issues here that the format doesn't quite manage to do away with. One, the difficulty is pitched on the forgiving side of easy. If you're an experienced arcade hand, you'll go through this game quicker than 50 Cent dumping Vivica Fox. Added to this is the fact that the powers of certain heroes occasionally have an unfair advantage in supposedly tough situations. Because you can switch between characters, you can often escape unscathed from perilous situations — something that should have been caught in testing period.

On the flip side, this makes the game's action well suited to casual players because they aren't controller wizards who think nothing about doing the cryptic crossword with one hand while playing Warcraft 3 with the other.

The second issue is the occasional impracticality of the game's action. You're a superhero, yet the game errs on the side of conservatism when the time comes to flex your powers. If you're The Thing and you hit the average thug with your huge boulder fist, they shouldn't be hopping up after a couple of seconds for more, surely? If you're a fire-wreathed flying Human Torch, when you throw a fireball at someone, they should be burnt to a crisp, not jumping up for more…

Such is the reason for super villains in these stories — so the heroes can actually demonstrate vulnerability. However, in the game, you spend a lot of time beating up generic robots and humans — all of which you should really be able to dispatch effortlessly. Sure, you get a chance to splash out with some nice-looking special effects and combinations, but just as often, you'll be punching on rather than doing the "super" part.

There's enough here to make sure this game is more Nickelback (middle of the road, reliable) than Malmsteen (erratic, prone to implosion). A juicy engine and the casts' voice-overs could have been better exploited if a few more risks had been taken in the game's production.

Fantastic Four manages to stand on its own two feet as a decent playing experience. You're not scraping the bottom of the barrel here — unlike with Spiderman 2 and Catwoman, in comparison to which, Fantastic Four is a breath of fresh air. The price is a very positive factor and there's enough in the game to justify the expense.

Definitely worth a look for casual gamers in particular.




Can you believe some people get to drive machinery for a living?



This year's South American car dealer drab — next year's winter collection.

# Boiling Point: Road to Hell

**More bugs here than Jiminy Cricket's bachelor party. What we have here is... failure... to eliminate (most of them).**

● CONTACT **Atari** ● ONLINE **www.atari.com.au** ● PRICE **$79.95** ● VERDICT **2.5/5**

● UPSIDES **Atari came up with some good ideas...** ● DOWNSIDES **...but with lousy execution. Bug pimpin' baby!**

Games development is kind of like telling tall tales to your mates. It's often what you omit that makes the biggest difference. Sometimes it's best to cut your losses — something the makers of Boiling Point should have done prior to releasing this half-baked Far Cry/Grand Theft Auto hybrid.

Making a decent concept into a game is as much about execution as it is about ideas. And execution is where the Boiling Point subsides into lukewarm status. The plotline: you're on a mission to take down the scum who kidnapped your daughter. The way you accomplish this (and it's intended to be open-ended): you're given a factional system that dictates your interactions with the populace as well as a 25 square kilometre sandbox to play in.

You have to drive around a lot in this game. Nothing wrong there, except the cars uniformly handle about as well as your mum's old Datto, complete with bald tyres and dodgy gearbox. This makes the frequent lengthy travel times you endure — often without any kind of opposition — quite a chore. It's kind of like trying to do your shopping with the worst trolley at the supermarket. Sure it's possible, but the more time passes, the dumber you feel for not being more selective.

Then there's the combat. Your character (whose "Saul Meyers" moniker sounds like an each-way bet between Christianity and B-grade Hollywood) handles firearms with all the dexterity of Mark Latham's hairdresser. A lot of time is spent painstakingly trying to coerce physics to obey natural law. Fair play if he was meant to be a random fella thrown into turbulent events, but he's supposedly a top-gun legionnaire.

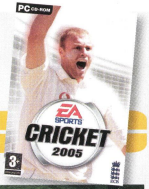
The game has too many half-formed ideas and bugs in the run of play. Throw in a playing area that could do with being cut into a quarter of its current size, and it leaves Boiling Point with about as much chance of making the big time as the "featured face" on IMDB.com.

# Cricket 2005

**Australia's in for a stiff challenge this season, so what better time to polish up on your digital skills, right? Bzzzt.**

● CONTACT **Electronic Arts** ● ONLINE **www.easports.com.au** ● PRICE **$69.95** ● VERDICT **2/5**

● UPSIDES **They're making that graphic engine do a little more work.** ● DOWNSIDES **Pretty much everything else.**






The Kiwi openers shrank before the fierce Aussie attack. Literally.



Visible — three stumps, two players, one ball... and no fun.

Electronic Arts' enviable position as ruler of the games software industry does have a few drawbacks. Lately, there's been an ever-increasing variance between its "good" and "bad" products.

Case in point: Cricket 2005. Compared to the rest of the EA sports lineup, it's the runt of the litter. In cricketing terms, it's Bangladesh, or even worse, Canada. The developers, HB Studios, broke the game down into three phases — batting, bowling and fielding — and then made your chances of enjoying each of these individual aspects of cricket about as fun as trepanation.

Every aspect of Cricket 2005's play is hard. For one, if you don't have a controller, you're in for a world of pain. Why not make a PC cricket game that allows the bat to be controlled by a mouse?

It seems like a simple enough idea — wave the mouse around and the bat follows accordingly. If the ball gets in the way, calculate velocity and direction. But no. In Cricket 2005 world, you have a canned selection of shots that need to be played with split-second timing. Fail to do so (and you will) and you'll have a stay at the crease of roughly the same duration as Warnie quitting the ciggies.

Bowling and fielding are marginally easier because for one, you can automate fielding (tip: just close your eyes every time the CPU openers flog the ball past your fielders to the boundary). Bowling at least gives you a fighting chance, if you're very coordinated and can repeat the same deliveries in the same slot. Any deviation and the computer has no qualms about smacking the ball over the boundary.

This skill imbalance ensures double-digit innings totals for you — and subsequently a long day in the field chasing leather. The way the game looks isn't terrible, and it's obvious the graphic engine got a lot more developer attention than the control method or the AI level of players.

TOP FIVE

# Battlefield 2 personalities

**Electronic Arts' excellent shooter attracts a diverse array of punters — Downtime salutes the five most prevalent.**

## 5 FIGHTER JOCK



**Think you're gonna get in that plane? Not likely, buddy. The Fighter Jock will shoot you — even if you're on the same side — to ensure they get up, up and away. Don't think it gets any easier if you manage to win your way on board. The tinkle of small-arms fire peppering your cockpit is the Fighter Jock's way of saying, "Not happy, Jan!" While the rest of us normal people are banging away with the keyboard and mouse, the Fighter Jock has the joystick happening, as well as a navigator and wingman standing by. How can you compete with such zeal? You can't. Give 'em the damn plane! They'll fly it into a mountain sooner or later. Favourite movie: *Top Gun* (or if they've been really unlucky, *Firebirds*).**

## 4 RAMBO



It doesn't matter whether there's 16 or 60 players on your server, this guy — and make no mistake, it invariably is a guy — makes Lone Wolf McQuade look like a party animal. The Rambo's no faceless automaton destined to slave life within a squad. Hell no! He'll take the enemy apart single-handedly. Going at it alone is his thing, and nothing you'll do or say can change that. He's got his assault rifle (which he's probably named) and a handful of grenades. And whatever you do, don't try to give a Rambo orders. Save that for the other clowns playing with no tactical awareness. If he wanted to take orders, he'd be at his day job, holding it down as the longest-serving kitchen hand at your local fast-food family restaurant. Identifying characteristics: often seen riding a jeep. Alone.

## 3 SNIPER



**Identifying characteristics: found on top of a building, prone and oblivious to the fact that an enemy behind him is about to plunge a knife into his back. The Sniper is a distant relation of Rambo, except they like to be as far away from the action as possible. No matter where the main thrust of battle is, they will be perched at some lofty position, hoping to plink away at stragglers. Doesn't matter that everyone is running around in tanks, planes or jeeps, the second they are on foot, the Sniper will be ready for them. If they happen to be in range and they obligingly stand still and... you get the picture. Equipment malfunction is a large part of the Sniper's lot, every missed shot falling into the "stupid game" category.**

## 2 COMMANDER



**The makers of Battlefield 2 thought it would be great to include a special Commander role for each team. The Commander is meant to (a) coordinate troop movements, (b) drop supplies to the team, (c) scan for enemies and (d) fire off artillery. Ninety percent of the Commanders know all about (d) and nothing else. Sadly, if your Commander is part of that elite 90%, they will usually drop a massive aerial bombardment on the biggest concentration of enemy players — even if they are engaging you in close-quarters combat. Well, they were before your Commander killed everyone in the vicinity. Let's hear it for friendly fire! Most commonly uttered phrase? "Er, sorry team!"**

## 1 THE PRO



**Wannabe pro-gamer thinking runs along very simple lines: anyone who gets killed by you is a noob (newbie); anyone who kills you is a lucky noob, possibly a cheat. Until there is documented proof to the contrary, the Pros are the best players in the world at this game. Sure, Battlefield 2's ranking system allows players to grow a persistent score, but people who follow that are probably noobs. When a Pro's internet connection stops playing up/ hard drive starts working properly/video card gets upgraded, nobody will be able to touch them. The crazy Iraqi propaganda guy has nothing on a wannabe Pro gamer when it comes to spirited delusion. To incur the wrath of a Pro gamer, score better than them.**

## Inside the SPAM Cartel

● PUBLISHER **Syngress** ● ISBN **1932266860**

**Spam — mass unsolicited email — is a persistent problem. While keyword filtering, DNS blacklists, advanced AI approaches, even legislation with threats of fines and imprisonment have been used as deterrents, spammers manage to find a way around them.**

***Inside the SPAM Cartel* is engrossing, detailing a remarkable world of hidden money, law skirting, ISP switching and filling people's inboxes with junk for a living.**

**It's fascinating to learn of the fine line these people must walk with the companies they promote — which may, in turn, cheat them out of their "hard-earned" money.**

**The weight of antispam legislation (in the US at least) is carefully dissected. Yet spammers persist, even with such penalties, and this book makes it easy to see why. Huge amounts of money are being made daily from spam. Most people recognise that there must be money in spam based solely on the sheer volume of messages sent. However, this title really hits the message home.**

**Happily, the author gives many practical tips on how to protect yourself from it, along with frauds and phishing attempts.**

**PC users of all levels — whether you're an end-user or systems administrator, and regardless of how technical you are — should consider reading this book.**

***David Williams***




## Buffer Overflow Attacks

● PUBLISHER **Syngress** ● ISBN **1932266674**

Most computer literate people are aware of buffer overflow attacks. But how does someone actually discover how and where a buffer can be exploited?

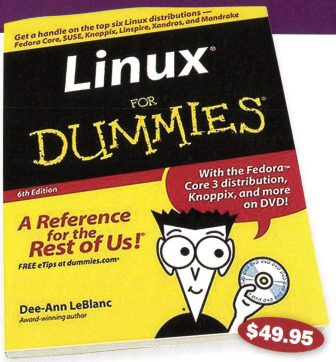
*Buffer Overflow Attacks* lifts the lid on buffer exploits and demonstrates with remarkable forensic precision and care how they really work. This includes real-world case studies on a variety of platforms — including Windows and variants of Unix. The examples used aren't simple — exploits in MDAC, Seti@Home and X11R6 are detailed and dissected.

In one sense, there is danger in a book like this as it actually shows how vulnerable code can be found and used for personal advantage. However, awareness and education are great preventative tools.

This is an essential book for software developers, and thankfully it's well-written, accessible and absolutely fascinating.

***David Williams***




# Linux for Dummies 6th Edition

● PUBLISHER **Wiley** ● ISBN **0764579371**

It's now easier than ever to try out Linux. The development of "live" distributions, such as Knoppix, let first-timers taste a Windows alternative without the need to install applications or mess around with re-partitioning hard disk drives.

The *Dummies* series of books explain technical mumbo jumbo like no other, and this sixth edition Linux guide is no exception. Written in a conversational and entertaining voice, without being overbearing, it's an easy and welcoming read that doesn't skimp on the technical details.

Starting with the absolute basics, the book gives a brief rundown on Linux's history and uses. It then describes the easiest methods of installation, and illustrates them with screenshots for readers to follow along with. Novice Linux users will find it easy to select a distribution, install it and be up and running in no time.

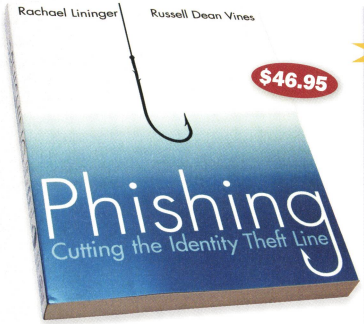
This book is Fedora Core 3 specific, but it explains the installation and basic set up of each of the distros on the included DVD. Much like the *Linux Bible* books, it encourages users to find one which best matches their tastes and needs. *Linux for Dummies* is desktop focused while the *Bible* branches a little further into servers.

Once installation is complete, the book moves on to Internet connection, navigating files, security, customising themes and Windows emulation. The back of the book features a top ten troubleshooting guide and a list of commonly-used commands.

The DVD includes a live version of Knoppix and for the more adventurous, ISOs for creating your own Fedora Core 3, SUSE, Linspire, Xandros and Mandrake installation CDs. You may want to download the latest releases though, as Fedora Core 4 is already available (the ISO files are on the *APC* August cover DVD).

*Linux for Dummies* provides an excellent springboard for those with either no knowledge or a basic understanding of Linux, and gives would-be switchers a concise and informative entry into the world of alternative operating systems.

***Dan Chiappini***




# Phishing: Cutting the Identity Theft Line

● PUBLISHER **Wiley** ● ISBN **0764584987**

Identity theft is something everyone dreads. No-one likes the idea of having their cash drained, credit cards maxed out or having new accounts opened in their name. According to *Phishing*, these crimes are now so easy to perpetrate that anyone can tap into a river of money anytime they feel like it. With a huge number of PCs said to be infected with malicious software, and billions of spam emails sent every day, the opportunities to profit electronically are enormous. And hardly any of it ends in prosecution.

The main thrust of the book is that while fraud is perpetual, the ways of performing it are rapidly transforming. In particular, "phishing" through the use of mass emails, fake Web sites, hijacked computers and spyware makes obtaining mountains of private information trivial. The book explains how phishing campaigns work, what they look like, and what to do about them — even if you've already been ripped off.

*Phishing* paints a frighteningly realistic picture, with enough statistics to make your head spin. While Mac and Linux users can employ it to back claims that Windows is a dead platform, managers and executives can use this book as a starting point for better protecting customers and shareholders alike.

Don't expect a message of hope though. *Phishing*'s co-authors, both professionals in the field, may inject humour into the text, but the overall effect is one of doom and gloom. There's even a chapter dedicated to why phishing will never be stopped. It's a depressing thought, and one that certainly brings pause to those who trumpeted e-commerce as a panacea just a few years ago.

At under 200 pages this book is a quick read, although its networking and security concepts put it outside the realm of tech novices. And as it was written with a US audience in mind, not all of the legal references may be relevant.

***David Emberton***

# Java 2 A Beginner's Guide Third Edition

● PUBLISHER **McGraw-Hill/Osborne** ● ISBN **0072231890**

*Java 2 A Beginner's Guide Third Edition* is a well-written yet inconsistent title. Starting off with the fundamentals, data types, control logic, methods, classes and basic OO concepts are introduced.

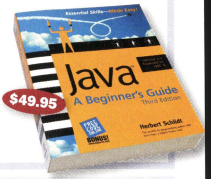
The explanations are well-written, making most of them easy to understand. All of the examples suit their respective topics, however, some of them are too generic — can recursion be explained without using the factorial example for once?

Things begin to take a turn near the middle of the book. Several chapters are dedicated to inheritance, packages and interfaces, followed by exception handling, input and output. Even though this book is a beginner's guide, these chapters seem to be written for people with some experience.

It's even more unlikely that "beginners" will understand and utilise the chapters on multithreading and generics.

While large portions of this book are accessible to beginners, some chapters require a little more skill and therefore, it's probably better suited to students.

***Peter Sbarski***




# Information Security Illuminated

● PUBLISHER **Jones and Bartlett** ● ISBN **076372677X**

**A comprehensive survey of current and critical information security practices, *Information Security Illuminated* lucidly discusses key security concepts. It then reinforces the theory with a large number of scenario-based exercises and practical review questions.**

**The topics progress logically from basics like risk analysis to access control, disaster recovery, firewalls and more. There's also a complete tutorial for locking down major OSes.**




**However, much of this book's material is easily found on the Internet. The book's value lies in the detailed and thought-provoking questions that conclude each chapter. These range from theoretical questions to specific problems. There are also some bite-sized practical tips and warnings which provide food for thought.**

**The authors state that this book covers all the concepts necessary for attaining CISSP, TICSA, SSCP and Security+ certifications. But some of the editing is dubious — a table lists Windows' services which may be "unneeded". Glitches like this detract from the academic claims.**

***Information Security Illuminated* does have material of interest, and although much can be found through other means, it forms a comprehensive whole.**

***David Williams***

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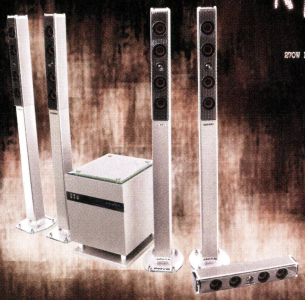
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# WIRELESS KA-CHING

Buttering up a talkshow radio shock jock might have once been something to be ashamed of, but wireless network operator Unwired came right out with a press release to announce that it had formed an alliance with the radio station that hosts the king of the airwaves, Alan Jones.

Feared by politicians but known to be a bit of a fan of wireless data systems, Jones' radio station will receive millions of dollars worth of cash and shares over three years.

Unwired CEO David Spence said: "As Australia's undisputed talk back King, Alan Jones will play an important role in helping Sydney to understand the simplicity and the potential of Unwired's wireless broadband offering".

Once he gets his producer to find the hole for the cable thingey that connects the rabbit to the typewriter thingummybob on his desk no doubt.

## Bill Gate's reality distortion field

Microsoft's next generation version of Windows — formerly dubbed Longhorn and now unveiled as Windows Vista — is getting many of the features Mac users have enjoyed for several years with Mac OS X — including Steve Jobs' famous reality distortion field, it seems.

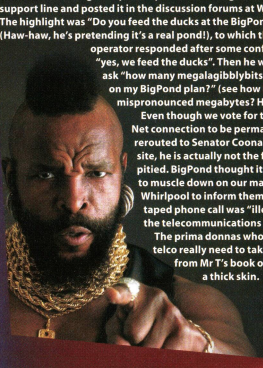
Microsoft did a global Web cast of its Windows Vista launch (*http://tinyurl.com/cm4nv*) which would have to rate as one of the most pointless exercises of all time since it essentially said nothing except that the company was launching a new version of Windows. However, the fans in attendance clapped and cheered like crazy — as if Gatesy had said something that we, um, didn't already know.

We understand that Microsoft's next announcement will involve charging US$100 a year for Hotmail access and that it's suing some bloggers.



# PITY THE FOOL!

Some lamer made a WAV recording of a "prank" phone call to BigPond's tech support line and posted it in the discussion forums at Whirlpool. The highlight was "Do you feed the ducks at the BigPond?" (Haw-haw, he's pretending it's a real pond!), to which the operator responded after some confusion, "yes, we feed the ducks". Then he went on to ask "how many megalagibbly bits do I get on my BigPond plan?" (see how he mispronounced megabytes? Half wit!).



Even though we vote for this idiot's Net connection to be permanently rerouted to Senator Coonan's Web site, he is actually not the fool to be pitied. BigPond thought it necessary to muscle down on our mates at Whirlpool to inform them that the taped phone call was "illegal under the telecommunications act".

The prima donnas who run this telco really need to take a leaf from Mr T's book of growing a thick skin.




## Jim's Mowing down the spammers

Jim Penman, that's right, *the* Jim Penman, who founded Jim's Mowing, has branched out into the antispam business (*www.jimsspam killer.com*). Sick of getting small gumnuts caught in the blades of his mowers, he decided to mow down the nuts who send out spam instead.

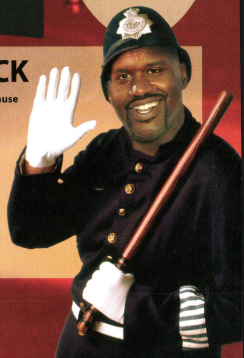
We know what you're thinking. What does a professional lawn mower know about the intricacies of spam prevention? But we think he's a freaking marketing genius. The hard-core investigative journos at *A Current Affair* and *Today Tonight* now have the opportunity to do segments incorporating evil computer viruses, inbox-clogging spam, Aussie battlers *and* lawnmowing all at once!

# SHERIFF SHAQ ATTACK

Hoop shootin' has-been Shaq has signed up for the worthy cause of hunting paedophiles. Sheriff Shaq has trained as a reserve Sheriff in Jersey and has decided to spend his retirement looking for rock spiders on the Internet.

So when a tanned, blonde 16-year-old who is eager to meet you approaches you in an IRC chat room, you know it's probably not a hairy, nude man but rather a bronzed professional ball player.

APC Lab rats hear that Shaq is looking for more assignments. We told our source at the Shaq Shack that we'd ask APC readers to suggest a few assignments for the washed-up elder of basketball. Send your suggestions for Sheriff Shaq's next assignment to chipchat@apcmag.com.



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# What's New?



## PCI to PCMCIA Adapter

This PCI card allows the use of PCMCIA and PC Card devices designed for notebooks in a standard desktop PC.
Cat 6539-1 $69



## Skype Phones

Use Skype to make free PC to PC calls & calls worldwide to landline & mobile phones at ridiculously low rates. Both phones integrate with Skype.
Cat 10165-1 Desktop $129
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## Cash Drawer

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## GSM/GPRS Serial Modem

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Cat 10175-1 $579



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Perfect for any warehouse with a range up to 46m and a battery life of 8hrs. The scanner meets tough environmental standards such as an IP54 rating for dust and wind blown rain, and a drop specification of multiple 2m drops to concrete! It also has a frictionless scan mechanism, shock mounted optical components and a diamond-coated, shatterproof window. The ability to use multiple scanners with only one base station makes the PSC Powerscan a cost effective industrial solution.
Cat 1008197-1 Scanner $1099
Cat 1008198-1 Base $769



## Digital I/O to Ethernet

This unit allows the user to remotely control 7 Digital I/O ports and 1 RS232/422/485 port over LAN or WAN.
Cat 15157-1 $329



## Laser Barcode Scanner

This stylish laser scanner is ideal for small to medium sized retail outlets. Stand available.
Cat. 1008039-1 $399



## Fingerprint Reader

Provide secure access to your PC using this USB fingerprint reader. Integrates with Windows logon for easy installation.
Cat 9237-1 $149



## Digital & Analogue TV Tuner

A unique TV tuner card that can receive the older analogue transmissions and newer DVB-T digital TV transmissions. The card also has an RCA input and the PC can be switched on and off with the included remote control.
Cat. 3567-1 $199



## RFID Controller

Ideal for security applications this RFID controller allows secure access via RFID tag, PIN code or both. Can be attached to a PC for access logging.
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Cat 17079-1 $139



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Cat 9229-1 $69



## Dual VGA KVM

A KVM switch that works with two dual monitor enabled PC's. Use dual monitors and only one keyboard and mouse to control the two PCs.
Cat 11676-1 $169



## Cordless Mini Keyboard

This black 88 key cordless keyboard includes a pointing device making it great for when space is an issue.
Cat 8750-1 $179

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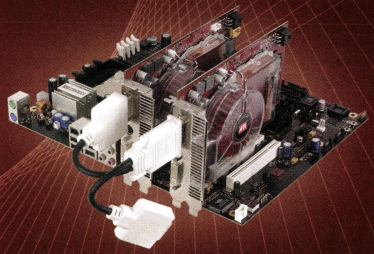
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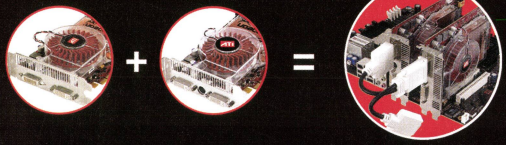
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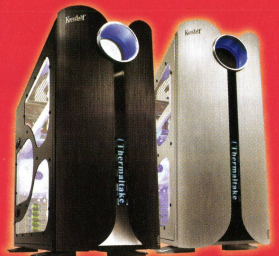
# A Case for all occasions

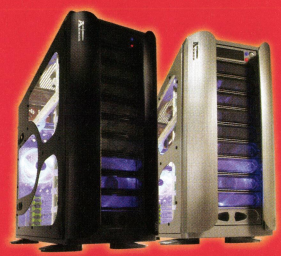
Coolall your Life

## Thermaltake Presents…Cases with 11 Drive Bays

Kandalf THE SUPER TOWER

ARMOR





**Optimised Thermal Management**

| Air Cooling System | Water Cooling System | Fanless System |
|---|---|---|
| Rear (Exhaust): 180x80mm,1600rpm,17dBQ<br>Rear HDD cooling<br>Top (Exhaust): 90x90x25mm, 1800rpm,19dBA<br>Front (Intake): 120x120x25mm, 1200rpm, 17dBA<br>Rear (Exhaust): 120x120x25mm, 1200rpm, 17dBA | | |



BTX supported MOTHERBOARD | ATX supported MOTHERBOARD | E-ATX supported MOTHERBOARD | Aluminium Case | BTX supported MOTHERBOARD

**SPECIFICATIONS - VA8000 & VA9000 SERIES**

| | |
|---|---|
| Drive Bays | 10 x 5.25" (external)<br>6 x 3.5 (internal) |
| Front Accessible | Up to 10x5.25",2x3.5" |
| Dimension (H*W*D) | 530x220x595mm |

* Armor & Kandalf cases have similar internal features
* All black cases have a steel chassis
* All silver cases have an aluminium chassis

## Tenor See The World in A Different Way

New Home Theatre Style PC Case from Thermaltake





Front 5.25" drive bay access

| Model Tenor | VB2000SNS | VB2000BNS |
|---|---|---|
| Colour | Silver | Black |
| Net Weight | 8.5 kg | |
| Dimension | 170 x 430 x 460 mm (H*W*D) | |
| Cooling System | ❄ Front (Intake):80 x 80 x 25 mm fan,2000rpm, 19dBA<br>❄ Rear (Exhaust): Dual 60 x 60 x 25 mm silent fan, 2500rpm, 19dBA | |
| Front Accessible Internal | 3 x 5.25",2 x 3.5" | |
| Material | Chassis: 1.0 mm SECC, Front bezel: Aluminum made | |
| Expansion Slots | 7 | |
| Motherboards | ATX, Micro ATX | |



Dual USB 2.0, IEEE 1394 Firewire, Audio & Speaker ports



Non-slip foot stands



Rear Fan (Exhaust)



Front Fan (intake)


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Thermaltake Coolall Your Life

# Anyware™ makes Networking and Home Entertainment Easy

***There are a vast number of computer accessories on the market today and they are constantly changing. It can be difficult to keep track of all the variations. One company that can ease your sourcing difficulties is Anyware Computer Accessories.***

***Anyware is not your average computer wholesaler. Commonly sourced products such as computer systems, monitors, hard drives or PC memory are not part of their product range. They do, however, have the widest, and possibly the wildest, range of computer accessories in Australia and New Zealand.***

***The plethora of products distributed by Anyware are mainly computer related peripherals or plug-in accessories for your PC or laptop. USB cables, mouse pads, keyboards, PC lights, speakers, notebook bags, graphic tablets, CD and DVD media, networking products, ink cartridges, uninterruptible power supplies (UPS) and KVM (Keyboard/Video/Mouse) switches are a few of the 2500+ products they proudly distribute.***

***Two product ranges which Anyware are particularly excited to launch into the Australian market are the TP-Link Networking Systems and the AL Tech MediaGate Media Players.***

## TP-LINK: Affordable Networking Solutions

TP-Link is the No.1 market share holder of home and small/medium business networking products in China. They are also the solution provider of choice for many large organizations. They specialise in wireless products, cable/DSL routers, switches, hubs, network adapters, ADSL & modems.



TP-Link offer affordable networking solutions with prices that everyone can afford.

• The TF-3239D network card with 10/100M PCI Adapter is available for under $10.

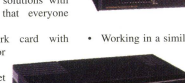
• Five and eight port Ethernet switches are available for $29 and $38 respectively. The TL-SF1005D and TL-SF10008D provide you with low-cost, easy-to-use, high-performance switching solutions.

• The TL-SF1016 16 port rack mount switch, priced at $95 and the TL-SF1024 24 port rack mount switch, priced at $149, are specially designed for Ethernet (10Mbps), Fast Ethernet (100Mbps) and Gigabit Ethernet (1000Mbps) with seamless link. Each port supports up to 2000Mbps throughput in full duplex mode.



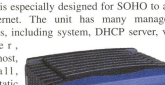


• Working in a similar fashion to the rack mount switches above, the TL-SG1005 5-Port Gigabit Switch and the TL-SG1008 8-Port Gigabit Switch, are priced at $155 and $189 respectively. These systems are the perfect choice to improve the performance of Office and Workgroup networks.



• The TG-3269 Gigabit LAN card, priced at $32, is a 10/100/1000Mbps, 32-bit 33/66MHz PCI-bus Gigabit Ethernet adapter. With single UTP/STP and Auto-Negotiation (Nway) function support, the Card can auto-negotiate 10Mbps, 100Mbps or 1000Mbps speed.

• The TL-R410 Multi Function Broadband Router with four port Hub (10/100), available for under $67.95, is especially designed for SOHO to access the Internet. The unit has many management functions, including system, DHCP server, virtual server, DMZ host, firewall, and static routing table.



Anyware is the exclusive Australian and New Zealand distributor for TP-Link products. Products can be purchased through most independent computer stores.

## AL Tech MediaGate: The Future of Home Entertainment

AL Tech specializes in leading edge products including USB storage products and multimedia products. Their latest offerings to the market are the MediaGate 2.5" and 3.5" Media Players. The MediaGate series is a revolutionary way to view movies, photos and listen to music. The hard drive enclosures of the MG25 and MG35 are capable of decoding movies, picture and music files. Files are downloaded onto the hard drive in the MediaGate and viewed by simply plugging it into a television.



The MediaGate 2.5" Media Player is a pocket sized device that connects to any TV and allows you to watch movies, view images and listen to MP3 songs. This portable media player allows DivX, MPEG4, DAT, Xvid, MP3, OGG, WMA and JPEG playback from any 2.5" notebook sized hard disk. (Hard disk not included, 20GB minimum recommended). Carry it with you anywhere you go using the optional case, use it in your car with the optional car adaptor, or connect it to your PC to be used as an external hard disk drive. The unit also includes an infrared remote, making it the ultimate Audio/Video companion. To add to the success of the MG25, the unit won the Top Buy Award in PC User in Jan 2005 and a PC Powerplay Power Award in Feb 2005.

The MediaGate 3.5" Media Player is the perfect addition to any home theatre setting and boosts a range of features including surround sound and LAN access.




Using the MG35 with Lan access, home entertainment has never been easier. This portable media player allows DivX, MPEG4, DAT, Xvid, MP3, OGG, WMA and JPEG play back. It sounds great with its Dolby Digital capabilities and its easy to search through all your music, movies and pictures with the user friendly remote control. Using a 3.5" hard disk drive (not included), the MediaGate MG35 can store hundreds of movies, music files or images ready for viewing via your TV. With networking capabilities, this handy unit allows direct playback of files from your PC. The MG35 has proven to be a successful and functional home entertainment system by winning the PC Powerplay Power Award in the August 2005 edition.



The MG25 and MG35 retail for $189.95 and $299 respectively and are available from most independent computer stores.

Anyware Computer Accessories – Home of Computer Accessories

Anyware are a wholesaler and do not sell direct to the public. For more information about the products listed above or any other product in Anyware's extensive range, visit www.anyware.com.au or call 1300 269 927.

# GIGATECH™

## iPod Accessories



22-in-1 Card Reader/Writer
+3-port USB 2.0 Hub Combo
(with illumination mirror)



USB 2.0 4 POrt Hub



USB 2.0 4 POrt Hub



Stereo Headset for iPod and iPod Mini



iPod iSplitter cable



iPod cassette adaptor



iPod USB car adaptor



iPod USB cable (0.8 meter)

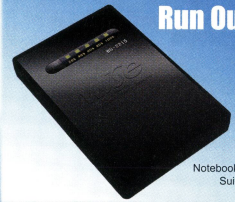


iPod IEEE 1394 FireWire
(0.8 meter)



iPod Dock Connector to
USB 2.0 + FireWire

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# Plug N Power





## Expandability

Plug-N-Power povides additional plug and optional cables to support the latest device on the market.

## Plug-N as needed

No more messy cables to hide away inside the case.

## ATX/BTX Ready Connector

Support all AMD and Pentium 4 motherboard in both ATX 20 pin and BTX 24 pin form factor.

## Dedicated Graphic Card Power Cable

EMI filtered power cable to provide pure power without interruption to your high end ATI and NVIDIA Graphic card.





# 19 inch LCD Monitors – Best Buys

## Polyview V293

**pc world BEST BUYS** **The PolyView V293 is a terrific screen for everyday use, watching movies and even playing games. It has a very low price tag of $499, yet provides excellent contrast, brightness and colour reproduction.**

If you've read the very low price at the bottom of this report and thought to yourself "it just can't be any good if they're giving it away at that price", then we're here to tell you that this monitor is indeed the best bargain in the entire round-up.

For $499 you get a screen that has both VGA and DVI inputs and one which also has a reasonable 21ms pixel response time and above average contrast and brightness ratings.

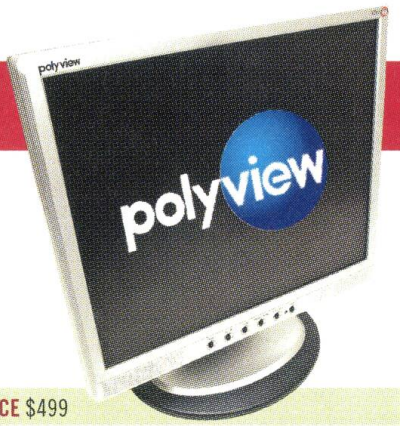
Additionally, this screen is manufactured using MVA technology, and we do rate the viewing angle of this monitor the second best in the round-up (second only to Sony). There was only a slight colour loss when viewing from greater than 150 degrees.

It has a 2cm thick bezel across the top and along the sides of the screen. This monitor is one of only two in the round-up to require an external power supply (the other one is the View Sonic).

The brightness level of this monitor was superb in our testing. Likewise, its 800:1 contrast ratio made the screen a pleasure to use for viewing text, image and movies. While its quoted response time (21ms) is one of the slowest in the reviews, it did do well in our motion blur tests. In particular, white test on black and grey backgrounds remained white and did not emit a noticeable trail as it scrolled across the screen, while black test emitted a very short trail and turned slightly grey on white backgrounds.

This screen is rated as being able to display 16.7 million colours and it did not disappoint us in the DisplayMate. Banding was not noticeable in the colour blending tests nor in the 256-level colour intensity ramps, which displayed very smooth gradients. Its ability to display low levels of grey on a black background was very good, so dark movies or photographs will not be drowned out by the black.

An inexpensive price tag, coupled with great performance, makes this model the pick of the bunch.




**PRICE** $499

**URL** www.protac.com.au

**WARRANTY** Protac supports this monitor with a three-year warranty. If the monitor is to be considered faulty, then it must have more than three bright pixels, more than five dark pixels or a combination of more than five bright and dark pixels.

**pc world BEST BUYS** **VERDICT** For $499, this monitor is a definite Best Buy. It performed well in all our tests, particularly the colour and motion blur tests and it has one of the best viewable angles in the round-up. The only thing we don't like is the external power supply, which may cause unnecessary clutter.

### Polyview outperforms 9 other LCD Monitors

| | | |
|---|---|---|
| 1. | Polyview V293 | $499 |
| 2. | Acer AL1912M | $749 |
| 3. | Viewsonic VA912 | $499 |
| 4. | NEC AccuSync LCD92V | $659 |
| 5. | Philips 190S | $749 |
| 6. | Mitsubishi DV191B | $729 |
| 7. | Sony SDMHS95PS | $1049 |
| 8. | BenQ FP91G | $649 |
| 9. | Samsung 913V$ | $699 |
| 10. | LG Flatron L1950S | $999 |

Elias Plastiras,PC World August 2005



**S17E**

**$379 RRP**

17" LCD monitor



**V372**

**$399 RRP**

17" LCD monitor



**V293**

**$499 RRP**

19" LCD monitor



**V396**

**$599 RRP**

19" LCD monitor

polyview

**Sydney:**
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**Melbourne:**
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## COMPUTER PARTS & ACCESSORIES Price are subject to change without prior notice

### CPU's

**Intel**

| | |
|---|---|
| Celeron 2400 | $113 |
| Celeron 2600 | $127 |
| P4 - 3.0Ghz 800 | $279 |
| P4 - 3.2Ghz 800 | $329 |

**AMD**

| | |
|---|---|
| Sempron 2200 | $85 |
| Sempron 2400 | $99 |
| Athlon XP 2800 | $140 |
| Athlon 64 3000 | $224 |

### Hard disks

| | |
|---|---|
| Notebook 40Gb | $110 |
| Notebook 60Gb | $149 |

*7200 RPM*

| | |
|---|---|
| **WD** 80GB 80Gb 8m | $90 |
| **WD** 1200JB 120Gb 8m | $117 |
| **WD** 2000BB 200Gb 2m | $145 |
| **WD** 2000JB 200Gb 8m | $149 |
| **Maxtor** 120Gb | $110 |
| **Maxtor** 160Gb 8m | $153 |
| **Maxtor** 200Gb 8m | $146 |

**Seagate**

| | |
|---|---|
| Barracuda 40Gb | $79 |
| Barracuda 80Gb | $89 |
| Serial ATA 80Gb 8m | $95 |
| Barracuda 120Gb | $115 |
| Barracuda 120Gb 8m | $119 |
| Serial ATA 120Gb 8m | $119 |
| Barracuda 160Gb 8m | $129 |
| Serial ATA 160Gb 8m | $139 |
| Barracuda 250Gb 8m | $188 |

### MS Software

| | |
|---|---|
| Windows XP Home | $129 |
| Windows XP Pro oem | $215 |
| Windows XP Pro X64 | $229 |
| Windows 2000 oem | $242 |
| Windows MediaCenter | $189 |
| Office 2003 Basic | $239 |
| Office 2003 student | $209 |
| Office 2003 Pro Ac Ed | $239 |
| Office small bus 2003 | $339 |
| Office Pro 2003 oem | $439 |

### CD & DVD Roms

| | |
|---|---|
| 52x CDROM | $25 |
| DVD 16x **Liteon** | $39 |
| DVD 16x **Samsung** | $39 |
| DVD 16x **Sony** | $45 |

### Motherboards

*Pentium 4*

| | |
|---|---|
| **Gigabyte** P4P800-MX$99 | |
| **Gigabyte** 8IPE1000PIIS153 | |
| **Gigabyte**8S661FXM77$956 | |
| **Gigabyte** 8I848775-GS109 | |
| **Gigabyte** 8S648FX775$99 | |
| **Gigabyte** 8I915P P | $165 |
| **Gigabyte** 8I915P Duo | $173 |
| **Gigabyte** 8I915P D P | $199 |
| **Gigabyte** 8I945P G | $237 |
| **Gigabyte** 8I955X Ro | $439 |
| **Gigabyte** 8IPE775 G | $129 |
| **ASUS** P4P800-S | $109 |
| **ASUS** P4P800-MX | $99 |
| **ASUS** P4S800-MX | $85 |
| **ASUS** P5P800 | $125 |
| **ASUS** P5GD1-VM | $175 |
| **ASUS** P5GPL | $160 |
| **ASUS** P5WD2 Prem | $295 |
| **ASUS** P5S800-VM | $99 |
| **Elitegroup** 661GX/800$79 | |

*AMD Athlon / Duron*

| | |
|---|---|
| **Gigabyte** 7VM400M | $77 |
| **Gigabyte** K8NS | $115 |
| **Gigabyte** K8NS-Pro | $145 |
| **Gigabyte** K8NNXP-939$149 | |
| **Gigabyte** K8NF-9 | $159 |
| **Gigabyte** K8NXP-9 | $259 |
| **Gigabyte** K8NS U 939 | $175 |
| **Gigabyte** K8V U 939 | $169 |
| **Gigabyte** K8VT890-9 | $148 |
| **ASUS** A7V400-MX | $83 |
| **ASUS** K8VSE deluxe | $159 |
| **ASUS** K8N-E deluxe | $169 |
| **ASUS** A8V-E deluxe | $215 |
| **ASUS** A8V deluxe | $180 |
| **ASUS** A8NE | $193 |

### Add-on card

| | |
|---|---|
| USB 2.0 4 port PCI | $25 |
| Firewire card 3 port | $30 |
| Firewire PCMCIA | $45 |
| PCI Ultra ATA 133 | $39 |
| **Leadtek** TV2000XP RM | $69 |
| **Leadtek** TV Expert | $79 |
| **Leadtek** TV DV2000 | $110 |
| USB blue tooth | $99 |

### Memory

**Call for the lastest prices**

| | |
|---|---|
| 256M pc133 | $59 |
| 512M pc133 | $99 |
| 256M DDR 3200 | $39 |
| 512M DDR 3200 | $79 |
| 512M DDR2 4200 | $79 |

**KINGMAX**

| | |
|---|---|
| 256M DDR 3200 | $42 |
| 512M DDR 3200 | $89 |
| 1Gb DDR 3200 | $189 |
| **Corsair** DDR 1G Twinx | $179 |
| **Corsair** DDR 512 Twinx | $99 |
| **Corsair** DDR2 1G 4200 | $162 |
| **Kingston** DDR 1G kit | $160 |
| **Kingston** DDR 512 kit | $89 |
| **Geil** DDR 512M | $85 |
| **Geil** DDR 256M | $49 |

**Notebook memory**

| | |
|---|---|
| 256M pc133 | $79 |
| 256M DDR 2700 | $54 |
| 512M DDR 2700 | $109 |
| 1G DDR 3200 | $199 |

### CompactFlash Memory

| | |
|---|---|
| 128M CompactFlash | $35 |
| 256M CompactFlash | $45 |
| 512M CompactFlash | $65 |
| 1G CompactFlash | $109 |
| 2G CompactFlash | $200 |

### Secure Digital Memory

| | |
|---|---|
| 128M Secure Digital | $31 |
| 256M Secure Digital | $48 |
| 512M Secure Digital | $75 |
| 1G Secure Digital | $99 |

### xD Memory

| | |
|---|---|
| 128M xD | $55 |
| 256M / 512M xD | $85/$125 |

### USB Flash drive

| | |
|---|---|
| USB drive 128M 2.0 | $25 |
| USB drive 256M 2.0 | $39 |
| USB drive 512M 2.0 | $59 |
| USB drive 1G 2.0 | $99 |
| USB card reader 12 in1 | $35 |

### Removable Storage

| | |
|---|---|
| Floppy drive | $20 |
| External box 2.5" USB | $29 |
| External box 3.5" USB | $49 |
| External box 5.25"USB | $59 |

### Video cards

| | |
|---|---|
| 64Mb GeForce MX440 TV out AGP | $55 |
| 128Mb GeForce FX5200 TV out AGP | $75 |
| 256Mb GeForce FX5700LE TV out AGP | $159 |

**ASUS**

| | |
|---|---|
| **Asus** ATI 9250TD 256M AGP | $109 |
| **Asus** N6600GT/TD 128M AGP | $329 |
| **Asus** V9400-X TD 128M AGP | $72 |
| **Leadtek** MX4000 A180BT 8x 64M | $59 |
| **Leadtek** FX5200 A340T 128M | $85 |
| **Leadtek** FX5200 A340TD 256M | $129 |
| **Leadtek** A6200TD 128M | $144 |
| **Leadtek** A6600GT 128M | $299 |
| **Leadtek** PX6600TD 256M | $199 |
| **Leadtek** PX6800GT 256M | $559 |
| **Leadtek** PX7800GT 256M | $859 |
| ATI Radeon **GeXcube** 9250SE 128M | **PCI** $105 |
| ATI Radeon **Gigabyte** 6600 256M | **AGP** $239 |
| ATI Radeon **Gigabyte** RX700PRO 256M | $239 |
| ATI Radeon **Sapphire** 9250 128M | $50 |
| ATI Radeon **Sapphire** 9550 256M | $99 |
| ATI Radeon **Sapphire** X300SE128M PCIX | $99 |
| ATI Radeon **Sapphire** X850XT 256M PCIX | $759 |

### CD Rewriters / DVD writers

| | |
|---|---|
| **Sony** CRX230E 52x32x52 IDE drive oem | $45 |
| **Sony** CRX320E 52x24x52 16x DVD oem | $59 |
| **Liteon** 52x32x52 IDE kit | $40 |
| **Liteon** 52x32x52 USB external kit | $89 |
| **Liteon** 52x32x52 16xDVD USB external kit | $109 |
| **Liteon** 52x32x52 16xDVD Combo | $60 |
| **Samsung** SM-252FRNS 52x32x52 | $39 |
| **Samsung** SM352BRNS 52x32x52 16XDVD | $59 |
| **Samsung** DVDRW Dual Layer 16XDVD | $85 |
| **LG** GCE 8525B 52x32x52 IDE oem | $40 |
| **LG** GCC-4520B 52x32x52 16X DVD | $59 |
| **LG** GSA4163B DVD 16x burner | $89 |
| **LG** GSA5163B DVD 16x burner USB | $165 |
| **Pioneer** 110D DVD burner oem | $89 |
| **Sony** DW-D26A 16x Dual Layer | $129 |
| **Sony** DRU800A 16x Dual Layer | $129 |
| **Sony** DRX800UL 16x Dual Layer | $209 |
| **Liteon** LDW-1693S DVD burner | $90 |
| **Liteon** SOHW-1673SX DVD burner | $165 |

### Sound cards

**CREATIVE**

| | |
|---|---|
| Live 24 bit | $59 |
| Audigy ZS 7.1 | $165 |
| Audigy2 ZS Platinum | $319 |
| Audigy2 NX | $209 |

### Networking

| | |
|---|---|
| NIC 10/100Mb | $12 |
| **SMC** 10/100Mb | $20 |
| 5 port switch 10/100 | $29 |
| 8 port switch 10/100 | $39 |
| **Netgear** WGR614 | $95 |
| **Netgear** RP614 | $81 |
| USB hub 4 port 2.0 | $29 |

### Monitors

| | |
|---|---|
| 17" **Benq** G775 Flat | $160 |
| 17" LCD **Benq** FP71G | $329 |
| 17" LCD **Benq** FP71V | $369 |
| 19" LCD **Benq** FP91G | $499 |
| 17" LCD **LG** 1750SQ | $349 |

### Cases / Power supply

| | |
|---|---|
| ATX mini case | $65 |
| ATX **Aopen** H600 | $143 |
| ATX **Macase** KA380 | $145 |
| ATX **Macase** KA-6c2881 | $120 |
| ATX **Macase** KA-747 | $129 |
| ATX **Antec** Sanata | $179 |
| ATX **Antec** Super Lanboy | $142 |
| ATX Power 300w | $40 |
| ATX Power 400w | $55 |
| **Antec** Truepower 330 | $89 |
| **Antec** Truepower 430 | $120 |
| **Antec** Truepower 550 | $169 |

### Printers

| | |
|---|---|
| **Brother** MFC-8440 | $764 |
| **Brother** HL-5140 | $349 |
| **HP** Deskjet 3550 | $69 |
| **HP** Photosmart 7260 | $105 |
| **Lexmark** X7170 | $269 |
| **Canon** LBP3000 | $215 |
| **Canon** MF5650 | $523 |
| **Canon** MP390 | $249 |
| **Epson** 8510 | $339 |
| **Epson** R430 | $205 |

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### Intel Ultra

- **Gigabyte** motherboard
- 512m PC3200 DDR
- 80Gb 7200rpm HDD
- Panasonic FDD
- 64mGeForce 4 MX
- 3D sound
- 16x DVD Rewriter
- 17" LCD monitor
- Subwoofer speakers
- Midi deluxe ATX case
- Microsoft Multimedia K/B
- Microsoft Intellimouse & pad

Celeron 2.4 $1019
P4 3.0G $1179

### AMD Gamer

- **Gigabyte** motherboard
- 512m PC3200 DDR
- 80Gb 7200rpm HDD
- Panasonic FDD
- 64M GeForce 4 MX 440
- 3D sound
- 16x DVD Rewriter
- 17" Flat monitor
- Subwoofer speakers
- Midi deluxe ATX case
- Benq Win98 keyboard
- Microsoft Intellimouse & pad

Athlon 64 2800 $929
Athlon 64 3200 $1029

### Intel Value

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| | |
|---|---|
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| **D-Link** Di-824VUP+ | $245 |
| **D-Link** DSL-504T | $112 |
| **D-Link** DSL-G604T | $159 |
| **Netgear** ADSL DG834g | $165 |

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| | |
|---|---|
| 240w SPKs | $15 |
| 400w SPKs with Sub-woofer | $25 |
| Logitech X-230 2 point Spks | $70 |
| Logitech X-530 5 point Spks | $110 |
| Logitech Z-560D 5 point | $479 |
| Creative SBS260 2point Spks | $27 |
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| Creative Inspire 2500 2 Spks | $65 |
| Creative Inspire 5200 5 Spks | $105 |
| Altec Lansing ACS200 | $25 |
| Altec Lansing 221 | $69 |
| Altec Lansing 251 | $125 |

### Mice

| | |
|---|---|
| Optical mouse | $20 |
| **Logitech** MX518 | $75 |
| **Logitech** MX1000 | $112 |

**Microsoft**

| | |
|---|---|
| Intellimouse PS/2 oem | $15 |
| Wheel optical oem | $24 |
| Intellieye oem | $39 |

### Keyboards

| | |
|---|---|
| **Benq** PS/2 | $16 |
| **Microsoft** multimedia | $30 |
| **Microsoft** wireless optical | $85 |
| **Microsoft** digital media pro | $45 |
| **Logitech** LX-500 | $106 |
| **Logitech** LX-700 | $131 |
| **Logitech** Cordless Desktop S | $85 |

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| T009 | $15.00 |
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| T018 | $10.60 |
| T026 | $ 9.70 |
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| T029 | $10.60 |
| T038 | $ 9.60 |
| T039 | $10.60 |
| T0321 | $10.80 |
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| T0540/1/2/3 | $ 8.90 |

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| T0561/2/3/4 | $8.90 |
| S020089 | $9.00 |
| S020093 | $5.10 |
| S020097 | $9.00 |
| S020108 | $6.50 |
| S020110 | $9.50 |
| S020187 | $5.10 |
| S020189 | $6.50 |
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| 51629A (#29) | $28.00 |
| 51645A (#45) | $24.00 |
| 51649A (#49) | $28.00 |
| C1823D (#23) | $30.00 |
| C6578D (#78) | $30.00 |
| C6614A (#20) | $24.00 |

| Model | TONNY |
|---|---|
| C6615DA (#15) | $24.00 |
| C6625A (#17) | $30.00 |
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| C6658AA (#58) | $26.00 |
| C8727A (#27) | $24.00 |
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| Model | Genuine | TONNY |
|---|---|---|
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| Model | Genuine | TONNY |
|---|---|---|
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| Model | TONNY |
|---|---|
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| 92298A | $65.00 |
| C3906F/A | $49.00 |
| C3903A | $59.00 |
| C3909A | $95.00 |
| C4092A | $49.00 |
| C4096A | $65.00 |
| C4127A | $65.00 |

| Model | Genuine | TONNY |
|---|---|---|
| C4127X | $169.00 | $ 80.00 |
| C4129X | $210.00 | $ 95.00 |
| C4182X | $239.00 | $135.00 |
| C7115A | $ 89.00 | $ 49.00 |
| C8061X | $165.00 | $ 85.00 |
| Q1338A | $189.00 | $ 85.00 |
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| Q2612A | $ 95.00 | $ 59.00 |

| Model | TONNY |
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| Q5942A | $95.00 |
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| | C9701/2/3A (CYM) | $135.00 | $ 79.00 |
| LJ4600 | C9720A (BK) | $199.00 | $155.00 |
| | C9721/2/3A (CYM) | $262.00 | $185.00 |
| LJ4500 | C4191A (BK) | $119.00 | $ 59.00 |
| | C4192/3/4A (CMY) | $165.00 | $ 69.00 |
| LJ8000 | C4149A (BK) | $150.00 | $ 89.00 |
| | C4150/1/2A (CMY) | $225.00 | $155.00 |

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|---|---|---|
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| ML-1710D3 | $ 98.00 | $49.00 |
| ML-4500D3 | $ 97.00 | $49.00 |
| ML-5200D6 | $163.00 | $65.00 |
| ML-6060D6 | $155.00 | $65.00 |
| SCX-4216D3 | $ 99.00 | $49.00 |
| SF-5100D3 | $ 95.00 | $49.00 |



## Canon Toner

| Model | Genuine | TONNY |
|---|---|---|
| EP-22 | $ 99.00 | $49.00 |
| EP-25 | $ 99.00 | $49.00 |
| EP-26 | $109.00 | $69.00 |
| EP-32 | $145.00 | $85.00 |
| EP-52 | $185.00 | $80.00 |
| E31 | $189.00 | $85.00 |
| FX3 | $132.00 | $59.00 |

## Brother Toner

| Model | Genuine | TONNY |
|---|---|---|
| TN-100 | $ 29.00 | $23.00 |
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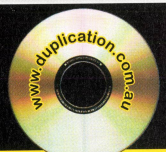
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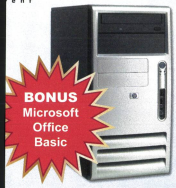
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- Harris Technology publishes price changes and any other important corrections regarding this catalogue both on its website ht.com.au, through notices in store and and by public notice in The Australian at the earliest opportunity.

### ORDERING & DELIVERY

Orders can be collected from one of our locations or delivered, anywhere Australia wide. Delivery times quoted by sales staff are our best estimates based on information received from the manufacturers. Please inquire about all freight charges as they vary for delivery locations and items purchased. The following estimates are offered as a guide only based on off peak state capital metropolitan deliveries.

### OFF PEAK

| | |
|---|---|
| UNDER 3 KG | **$13** |
| 3 KG - 5 KG | **$14** |
| 5 KG - 10 KG | **$33** |
| OVER 10 KG | **PLEASE CALL** |


**DESKTOPS, NOTEBOOKS, SERVERS & HANDHELD**

| | |
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| Kingston memory configurator | 3 |
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**SOFTWARE APPLICATIONS**

| | |
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| Dantz | 4 |
| TurboCad | 4 |
| Quicken | 4 |
| MYOB | 4 |
| Microsoft | 46-47 |


**Sales Enquiries** 1300 13 9999

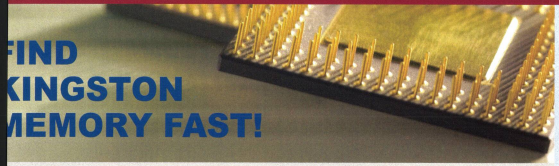
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**Web** ht.com.au

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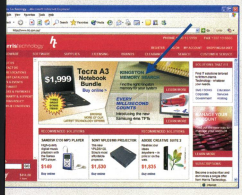
# ND KINGSTON MEMORY FAST!



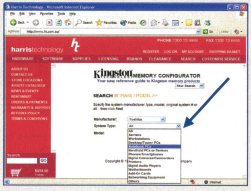
# FIND KINGSTON MEMORY FAST!

## ive Easy Steps

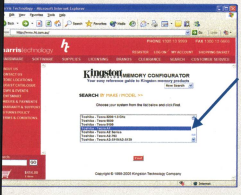
1 Go to **ht.com.au** & click on **Kingston Memory Search.**



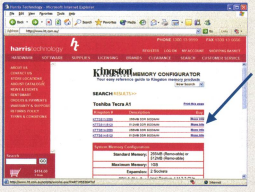
2 Search by **make / model** and click **Find.**



3 Select your system and click **Find.**



4 Select your memory product by clicking **More Info.**



5 **Add to your basket & order….It's so easy!**

## THE WIDEST RANGE OF MEMORY FOR CURRENT & LEGACY PRODUCTS

# UPGRADE WITH KINGSTON

### WIDEST RANGE

- **Current & legacy products**
- **Printers, notebooks, PCs, servers, mobile devices, routers & networking**

### SUPERIOR QUALITY

- Lifetime warranty
- 100% tested
- Guaranteed compatibility

### MAJOR SAVINGS

Up to 60% less than OEM memory prices.

### INDUSTRY LEADERSHIP

The world's largest independent memory module manufacturer.

### SERVICE SUPPORT

- Kingston Care - free lifetime support for system specific server & workstation memory.
- Kingston / IBM Service Agreement - IBM Service support on Kingston memory products.
- Your system warranty remains valid with Kingston memory.



**PLEASE NOTE:**
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# TOSHIBA

## TECRA A3 EXCLUSIVE SPECIAL

20th Anniversary — Toshiba Portable PC Since 1985

## SATELLITE M60

**POWERFUL, MULTIMEDIA PC**

The Satellite M60 is a powerful multimedia business machine with a 17" widescreen, the latest Intel Centrino mobile technology, and 80GB hard drive# storage capacity. The M60 delivers a spectacular technology and entertainment experience, with built-in tri-mode Wireless LAN 802.11 a/b/g for greater mobility. The M60 appeals to design-oriented professionals wanting a way to manage graphic, sound and digital content. The Satellite M60 offers business professionals balance between work and the rest of their lives.




Microsoft Windows XP Professional

Bluetooth

Wi Fi

- Pentium-M 740 1.7GHz
- 17" WSXGA+ screen
- 512MB DDR II RAM
- 80GB hard drive#
- DVD SuperMulti+DL
- WiFi a/b/g & Bluetooth
- Microsoft Windows XP Professional

Rent* $37.81/wk

D1016 **$3,630**

***RENTSMART**

The figures quoted are based on a per week basis over 3 years. Terms and conditions apply.

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## TOSHIBA TECRA A3 EXCLUSIVE SPECIAL OFFER

**"DOUBLE your RAM, TRIPLE your warranty and a BONUS carry bag!"**

- Intel Pentium M 730 1.6GHz processor
- 256MB DDR RAM
- 40GB# hard drive
- 15" XGA TFT screen
- DVD SuperMulti double layer drive
- 56k V.92 modem & Gbit LAN
- Wireless LAN 802.11a/b/g WiFi
- PCMCIA: 1 x Type II
- 5 in 1 Media Reader
- Weight: 2.7kg
- Battery life up to 4 hours
- Microsoft XP Professional
- 1 year warranty

EXTENDED WARRANTY — 3 years extended warranty



Belkin carry bag



256MB RAM

THREE GREAT BONUS ITEMS!



### EXCLUSIVE BUNDLE INCLUDES:

- Belkin carry bag
- Additional 256MB RAM (not installed)
- Harris Technology total 3 years extended warranty

**Limited Stock: Offer available only while stocks last**

Microsoft Windows XP Professional

Rent* $22.40/

L8783 **$1,999**

## PORTÉGÉ & LIBRETTO SERIES

**COMPACT AND LIGHT**

Ready to work when and where you are, the Portégé & Libretto series delivers an advanced combination of ultra-portability and expansion capability. Behind the compact design lies a power base ready to maximise performance with Intel Pentium M processors, large memory, and built-in wireless communication to keep you well connected wherever your business takes you. These functions combine to ensure your investment is well protected.

DVD SUPERMULTI DOCK INCLUDED Libretto U100 only



Libretto U100

Microsoft Windows XP Professional

| PORTÉGÉ | LIBRETTO U100 | R200 | M300 | M200 TABLE |
|---|---|---|---|---|
| MOBILE PENTIUM M | 753 1.2GHz ULV | 753 ULV 1.2GHz | 753 ULV 1.2GHz | 750 1.8GH |
| RAM STD | 2 x 256MB RAM | 2 x 256MB | 2 x 256MB | 512MI |
| HARD DRIVE | 60GB# | 60GB# | 60GB# | 80GB |
| SCREEN | 7.2" WXGA | 12.1" XGA | 12.1" XGA | 12.1" SXGA |
| 56K V.90 & 10/100 LAN | Yes | Yes | Yes | Ye |
| WIRELESS LAN | WiFi b/g & BT | WiFi b/g | WiFi a/b/g & BT | WiFi a/b/g &B |
| OPTICAL DRIVE | DVD SuperMulti+DL | No | DVD SuperMulti | N |
| WEIGHT | 791g | From 1.3kg | From 1.6kg | 2.1k |
| OP SYSTEM | XP Pro | XP Pro | XP Pro | XP Table |
| WARRANTY | 1 Year | 3 Year | 3 Year | 3 Yea |
| RENT* | $40.41/wk | $36.45/wk | $37.45/wk | $41.53/w |
| PART NUMBER | E5927 | S1808 | S0528 | S694 |
| PRICE | $3,959 | $3,499 | $3,595 | $4,069 |

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

# ECRA A3, A4 & A5 SERIES

## ECRA A3

Windows XP Professional

BONUS 256MB RAM & BAG‡ (selected models only)



aturing the latest Mobile Intel Pentium M or Intel Celeron M
cessors and with a standard battery life of up to 4 hours, all
dels in the series deliver high levels of performance and reliability.
ping to maximise productivity is the full range of expansion and
nnectivity features including a PC Card slot, three USB 2.0 ports,
international V.92 modem and a 10/100 Mbit Ethernet LAN port.
**tional Port Replicator for the A3 Tecra notebook range**
**ilable.**

| ECRA | A3[δ] | A3^ | A3[δ] |
|---|---|---|---|
| ROCESSOR | Cel-M 370 1.5GHz | P-M 730 1.6GHz | P-M 740 1.7GHz |
| AM STD | 256MB | 256MB | 512MB |
| ARD DRIVE | 40GB# | 40GB# | 60GB# |
| CREEN | 15" XGA TFT | 15" XGA TFT | 15" XGA TFT |
| PTICAL DRIVE | DVD/CD-RW | DVD SuperMulti +DL | DVD SuperMulti |
| AN | 10/100 | Gbit | 10/100 |
| IRELESS LAN | WiFi Antenna | WiFi a/b/g | WiFi a/b/g |
| ARRANTY | 1 year | 1 year | 1 year |
| P SYSTEM | XP Pro | XP Pro | XP Pro |
| ENT* | $17.67/wk | $22.81/wk | $25.26/wk |
| ART NUMBER | 34253 | L6106 | 34259 |
| RICE | $1,595 | $2,035 | $2,365 |

EFER TO PAGE 4 FOR AN EXCLUSIVE SPECIAL OFFER ON THIS MODEL

## ECRA A4 & A5

Windows XP Professional



e Tecra A4 and A5 widescreen notebooks have been designed for small-medium
sinesses looking for the latest widescreen desktop replacement technology at an
ordable price. The stunning array performance features includes advanced docking
pabilities, easy connectivity options and choice of either 15.4-inch widescreen or
" widescreen. The larger display capacity allowing users to view and edit large
cuments, and watch DVDs with full detail on the optimum screen size.
e A4 and A5 offer low initial cost and no compromise on renowned Toshiba quality.

| ECRA | A4 | A5 |
|---|---|---|
| OBILE PENTIUM M | 750 1.8GHz | 740 1.7GHz |
| AM DDR | 512MB | 512MB |
| ARD DRIVE | 60GB# | 60GB# |
| CREEN | 15.4" WSXGA+ | 14" WXGA |
| IDEO RAM | 128MB | Shared |
| PTICAL DRIVE | DVD SuperMulti +DL | DVD SuperMulti +DL |
| IRELESS LAN | WiFi a/b/g | WiFi a/b/g & BT |
| ARRANTY | 1 year | 1 year |
| P SYSTEM | XP Pro | XP Pro |
| ENT* | $29.37/wk | $25.26/wk |
| ART NUMBER | S1029 | C9268 |
| RICE | $2,749 | $2,365 |

Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

2004 TOSHIBA RESELLER OF THE YEAR harristechnology

## TDP-T90 PROJECTOR




The TDP-T90 is a versatile, high performance projector that is perfectly suited to the business environment. Its combination of DLP™ technology, XGA resolution and a high contrast ratio (2000:1) delivers razor-sharp images and outstanding colour reproduction. Superb brightness of 2,200 ANSI lumens ensures perfect picture quality.

**Bonus**: The new Gigabeat F20 20GB mobile audio player brings music to life with a vibrant full colour screen that also displays digital photos



ΣBonus offer only available while stocks last, not in conjunction with any other offer.

Rent* $31.55/wk

S8517 **$2,999**

‡**Bonus offer**: Available only while stocks last. Not available in conjunction with any other offer.

***RENTSMART**
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# TOSHIBA

## TECRA M3 & S2 SERIES

20th Anniversary — Toshiba Portable PC Since 1985

## TECRA M4 TABLET PC



The M4 is a versatile and convertible Notebook for business professionals who won't compromise on the consistency, reliability and longevity of their business machines. Now executives can create data and browse information using natural pen-based input, saving precious time and protecting valuable intellectual property.

- Intel Pentium M 770 2.1GHz
- 2 x 512MB DDRII RAM
- 80GB# (5400 rpm) HDD
- 14.1" SXGA+ TFT (1400 x 1050)
- nVidia GeForce 6600 Go with 128MB Video RAM
- DVD SuperMulti +DL Drive
- 56K modem & Gigabit LAN
- WiFi a/b/g
- Weighs 2.8kg
- Microsoft OneNote and Windows XP Tablet Edition

Rent* $45.68/wk

S2872 **$4,950**

***RENTSMART**
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## TECRA M3 - NEW!

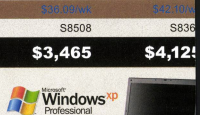
The Tecra M3 delivers a balance of portability, hardware and software image stability with high performance. The magnesium alloy chassis provides added durability whilst making it the lightest in its class. Combined with extended battery life (with optional high capacity and internal SelectBay battery), this makes the Tecra M3 the ideal road ready business notebook. Featuring Intel Pentium M Processors, a choice of DVD/CD-RW or DVD SuperMulti optical disk drive, Gigabit Ethernet, Firewire and Bluetooth options. The M3 provides a foundation to significantly boost business productivity.




| MODEL | TECRA M3 | TECRA M3 | TECRA M3 | TECRA M |
|---|---|---|---|---|
| MOBILE PENTIUM M | 740 1.7GHz | 750 1.8GHz | 760 2.0GHz | 770 2.1GH |
| RAM STD (DDR) | 512MB | 512MB | 512MB | 2x512M |
| HARD DRIVE | 40GB# | 60GB# | 60GB# | 80GB |
| SCREEN | 14" XGA TFT | 14" XGA TFT | 14" XGA TFT | 14" SXGA+ TF |
| VIDEO RAM | 64MB | 64MB | 128MB | 128M |
| OPTICAL DRIVE | DVD/CD-RW | DVD SuperMulti+DL | DVD SuperMulti+DL | DVD SuperMulti+D |
| WIRELESS LAN | WiFi a/b/g | WiFi a/b/g | WiFi a/b/g | WiFi a/b |
| WARRANTY | 3 year | 3 year | 3 year | 3 yea |
| OP SYSTEM | XP Pro | XP Pro | XP Pro | XP Pr |
| RENT* | $29.37/wk | $33.56/wk | $36.98/wk | $42.10/w |
| PART NUMBER | S8507 | S8365 | S8508 | S836 |
| PRICE | $2,749 | $3,189 | $3,465 | $4,12 |

## TECRA S2

The Toshiba Tecra S2 delivers outstanding performance and seamless wireless connectivity to business computing. Now free to perform at their best wherever business takes them, executives will appreciate the added mobile productivity of the Tecra S2 with up to 4.5 hours of battery life. Includes modem and LAN capabilities.




| MODEL | TECRA S2 | TECRA S2 | TECRA S |
|---|---|---|---|
| MOBILE PENTIUM M | 750 1.8GHz | 760 2GHz | 770 2.1GH |
| RAM STD | 512MB | 512MB | 512M |
| HARD DRIVE | 60GB# | 80GB# | 100GB |
| SCREEN | 15" XGA TFT | 15" SXGA+ TFT | 15" UXGA TF |
| VIDEO RAM | 64MB | 128MB | 128M |
| OPTICAL DRIVE | DVD SuperMulti +DL | DVD SuperMulti +DL | DVD SuperMulti +D |
| WIRELESS LAN | WiFi a/b/g, BT antenna | WiFi a/b/g, BT | WiFi a/b/g, B |
| WARRANTY | 3 year | 3 year | 3 yea |
| OP SYSTEM | XP Pro | XP Pro | XP Pr |
| RENT* | $30.67/wk | $37.80/wk | $43.70/w |
| PART NUMBER | F9587 | H1034 | C926 |
| PRICE | $2,915 | $3,629 | $4,61 |

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

# ORDLESS AND OPTICAL COMBINATIONS

## IRELESS HEADPHONES FOR iPOD




e power of wireless audio is in your control with gitech's wireless headphones for iPod™. Advanced uetooth™ frequency hopping technology provides erference free, crystal clear audio. Integrated iPod ntrols can adjust the volume, play, pause or select cks without touching your iPod. Includes a wireless apter that works with iPod or iPod mini™.

37942 **$189**

## MM22 PORTABLE SPEAKERS

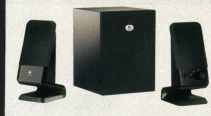


**NB: iPod not included**

Logitech's mm22 Portable Speakers are the perfect travel companion for your iPod. These high performance speakers utilise matching twin micro drivers for excellent audio. A deluxe, hard-shell traveling case holds your cables, AC adapter, and speakers neatly. Three holders are custom fit to hold 3G, 4G, and Photo iPods.

R8876 **$89**

## 20 2.1 SPEAKERS



e Logitech R-20 2.1 speakers offer dynamic audio a sleek, compact design. Its ported wood subwoofer splaces more air for deep bass. Connect these eakers easily to PCs, CD and MP3 players. Also cludes volume control and headphone jack. Satellites e shielded for use near a PC monitor or TV.

S6517 **$45**

## X-530 5.1 SPEAKERS



Pump up your PC surround sound with Logitech's X-530 speaker system. Dual driver satellites use FDD2™ technology to eliminate uneven response created by conventional dual driver designs. The ported subwoofer features a real-time equaliser that maximises punch while minimising distortion. Matching front and rear satellites deliver balanced surround sound.

P3349 **$119**

## ORDLESS DESKTOP LX 300



he Logitech® Cordless Desktop® LX 300 cleans up ur work space, and empowers your style. Control usic and video playback, open e-mail or Instant essenger, or navigate the web directly from the eyboard. Distinctive F-keys are programmable. remium cordless optical mouse tracks precisely, while new ultra-flat keyboard delivers leading-edge comfort. year warranty.

R3185 **$79**

## CORDLESS DESKTOP MX 3100



The Logitech® Cordless Desktop® MX 3100 is an exceptional blend of performance, comfort, and style that redefines expectations. With the breakthrough performance of the MX™ 1000 laser cordless mouse - the world's first laser mouse - advanced media and navigation controls on the keyboard, and stunning look and feel, the Cordless Desktop® MX™ 3100 simply delivers an experience unlike any other.

S1152 **$229**

## QUICKCAM IM




Logitech® QuickCam® IM lets you get closer instantly with live video and audio. Add live video to your favorite IM. Works with MSN® Messenger, Yahoo!® Messenger & Windows® Messenger. QuickCam IM includes a bonus headset for private conversations and a bonus clip.

N9485 **$79**

## QUICKCAM FOR NOTEBOOKS



Portable and easy to use, Logitech QuickCam for notebooks is a great way to stay connected at home or on the go. VGA-quality video, integrated microphone and snapshots up to 1.3 megapixels (interpolated) make this camera a versatile performer.

S6907 **$65**

## STEREO USB HEADSET 250

Skype Ready



Using digital USB technology, it enhances audio quality and provides simple plug and play functionality. Its noise cancelling microphone improves performance, while the leatherette ear pads and adjustable headband enhance comfort.

R7933 **$59**

## PREMIUM USB HEADSET 350

Skype Ready



This convenient headset features soft touch in-line volume and mute controls. Its noise cancelling microphone improves performance, while the plush ear pads and premium headband enhance comfort.

R7934 **$65**

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# SONY

## VAIO NOTEBOOKS

### SONY NOTEBOOKS

All notebooks have a Memory Stick Pro slot and are bundled with a full suite of multimedia software including:

- Adobe Premiere Pro Standard
- Photoshop Elements
- Picture Gear Studio
- Sonic Stage
- VAIO Zone
- Norton Anti Virus (OEM)

### VAIO ACCESSORIES

**WIRELESS KEYBOARD WITH TOUCHPAD & OPTICAL MOUSE**



S7004 **$249**

**WIRELESS OPTICAL MOUSE**



P0743 **$89**

### PORT REPLICATORS

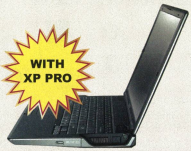
| | | |
|---|---|---|
| R7035 | FS SERIES | $269 |
| R7230 | S SERIES | $359 |
| Q4970 | T SERIES | $399 |

***RENTSMART**

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**VGNB77GP**
- **Pentium M 735 1.7GHz**
- 512MB RAM
- 40GB HDD#
- DVD/CD-RW Combo Drive
- Wireless LAN 802.11b/g
- 14.1" XGA Display
- **Weighs only 2.3kg**
- Windows XP Professional

Rent* $19.04/wk

S1263 **$1,699**




**VGNA49GP**
- Pentium M 770 2.1GHz
- **17" WUXGA with clear bright dual lamps LCD**
- **1GB RAM**
- 100GB HDD#
- **DVD±RW dual layer drive**
- Wireless LAN 802.11b/g
- Windows XP Professional

Rent* $46.13/wk

R9249 **$4,999**

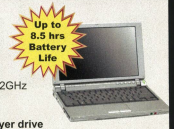
### ULTRA PORTABLE



**VGNS48GPB**
- **Pentium M 760 2GHz**
- 512MB RAM
- 60GB HDD#
- **DVD±RW dual layer drive**
- 13.3" WXGA Clear Bright LCD
- Wireless LAN 802.11b/g
- **Integrated Bluetooth**
- **nVidia Go 6200 with 128MB**
- Windows XP Professional

Rent* $36.45/wk

34275 **$3,499**




**VGNT37GPS**
- Pentium M 753 1.2GHz
- **1GB RAM**
- 60GB HDD#
- **DVD±RW dual layer drive**
- Wireless LAN 802.11b/g
- 10.6" WXGA with clear bright
- Integrated Bluetooth
- **Weighs only 1.38kg**
- Windows XP Professional

Rent* $38.53/wk

S1262 **$3,699**

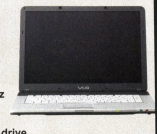
### WIDE SCREEN, FAST & SLIM



**VGNFS25GP**
- Pentium M 735 1.7GHz
- 512MB RAM
- 60GB HDD#
- **DVD±RW dual layer drive**
- **15.4" WXGA with clear bright LCD**
- Wireless LAN 802.11b/g
- Windows XP Professional

Rent* $26.70/wk

E0408 **$2,499**



**VGNFS28GP**
- **Pentium M 760 2GHz**
- 512MB RAM
- **80GB HDD#**
- **DVD±RW dual layer drive**
- Wireless LAN 802.11b/g
- 15.4" WXGA with clear bright dual lamps LCD
- Windows XP Professional

Rent* $31.55/wk

S7130 **$2,999**

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

# SONY®

## SLIM, STYLISH AND LIGHTWEIGHT

3LCD BRIGHT IMAGES GENTLE ON THE EYES NATURAL COLOURS

### VPLCS20 & VPLCX20

- 2000 ANSI Lumens
- SVGA Resolution (VPLCS20 model)
- XGA Resolution (VPLCX20 model)
- Slim (52mm) and stylish design
- Advanced intelligent auto set-up
- Short throwing distance
- Multiple inputs
- HD ready
- Digital zoom function
- Large screen viewing upto 300"
- Security password authentication system
- Remote control & carry case supplied
- 2 years warranty




VPLCS20 model featured

Rent* $27.34/wk

S7484 VPLCS20 - SVGA **$2,559**

Rent* $37.07/wk

S7487 VPLCX20 - XGA **$3,559**

## DIGITAL STILL CAMERAS

**THE RANGE OF SONY CYBERSHOT CAMERA'S FEATURES:**

- 32MB internal memory
- Carl Zeiss Lens superior colour reproduction, minimal distortion
- Large LCD for easy viewing and sharing
- MPEG Movie VX fine TV quality playback, capture your perfect moments in motion and sound
- PictBridge compatible for direct digital printing
- RIMP - Real Imaging Processor increased speed reduced lag time, quick auto focus and **increased battery stamina**

Cyber-shot MEMORY STICK PRO 32MB internal memory

### DSCS90S



- 4.1 megapixel
- 2.5" colour LCD
- 3x optical 6x digital zoom

S0761 **$429**

### DSCW5S



- 5.1 megapixel
- 2.5" colour LCD
- ISO sensitivity settings

R8761 **$529**

### DSCW7S



- 7.2 megapixel
- 2.5" colour LCD
- 7 scene selections

Rent* $8.73/wk

S1280 **$779**

### CRX230AE

**INTERNAL CD-RW DRIVE**
**52X 32X 52X**

S0531 **$49**

### CRX320AE

**INTERNAL CD-RW / DVD ROM DRIVE**
**52x 32x 52x 16x**

M2336 **$69**

### DRU800A

**INTERNAL DUAL LAYER DVD BURNER**
**RECORDS + /- DVD MEDIA**




R9028 **$149**

### DRX800UL

**EXTERNAL DUAL LAYER DVD BURNER**
**RECORDS +/- DVD MEDIA**
**USB2.0 & I.LINK/FIREWIRE CONNECTION**



R9041 **$269**

***RENTSMART**

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# HP COMPAQ NOTEBOOKS & POCKET PC

**HP iPAQ H6365 POCKET PC & GSM/GPRS SMARTPHONE**



**$150 CASH BACK^**

Bluetooth Wi Fi

- Processor: TI OMAP 1510
- Main memory: 64MB RAM (20MB iPAQ file store)
- Display: 240 x 320 TFT touch screen
- Audio: built In w/ 3.5mm jack
- Camera: VGA 640 x 480
- Input device: stylus
- Expansion: SD/MMCard Slot with SDIO
- Communication: integrated GSM/GPRS, 802.11b WiFi, bluetooth, infrared, USB cable
- Dimensions: 119 x 75 x 18mm
- Weight: 190g
- Battery: 1800mAh Lithium-Ion
- Microsoft Windows Mobile 2003 - phone edition
- Warranty: 1 year manufacturer's parts and labour

Rent* $11.19/wk

Q2078 **$999**

**TERMS & CONDITIONS:**

† Offer available from 01/09/05 to 30/09/05. Via redemption from HP web site **www.hp.com.au/notebookpromo.** Not available in conjunction with any other offer.

^ Offer available from 15/08/05 till 15/10/05. Via redemption from HP, visit **www.hp.com.au/retailpromotions** for details.

***RENTSMART**

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**PLEASE NOTE:**

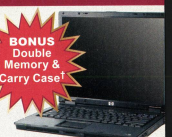
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## HP COMPAQ nx6120 SERIES

**PACKED TO PERFORM, PRICED TO PLEASE**

The HP Compaq nx6120 Business Notebook is packed with advanced technology features offering solid performance at a surprisingly affordable price. What's more, most models come with wireless connectivity so that you can get the job done effortlessly, wherever your work takes you.

**BONUS Double Memory & Carry Case†**



Windows xp

| MODEL | nx6120† | nx6120† | nx6120† | nx6120† | nx6120† |
|---|---|---|---|---|---|
| PROCESSOR | Cel-M 360 | Cel-M 360 | P-M 740 | P-M 740 | P-M 750 |
| CLOCK SPEED | 1.4GHz | 1.4GHz | 1.7GHz | 1.7GHz | 1.8GHz |
| RAM | 256MB | 256MB | 512MB | 512MB | 512MB |
| HARD DRIVE | 40GB# | 40GB# | 40GB# | 60GB# | 80GB# |
| SCREEN | 15" XGA | 15" XGA | 15" XGA | 15" XGA | 15" SXGA+ |
| OPTICAL DRIVE | Combo | DVD±RW | DVD±RW+DL | DVD±RW+DL | DVD±RW +DL |
| WIRELESS LAN | | | 802.11g | 802.11g+BT | 802.11g+BT |
| WARRANTY | 1 year | 1 year | 1 year | 1 year | 1 year |
| RENT* | $14.51/wk | $17.87/wk | $21.24/wk | $23.48/wk | $25.58/wk |
| PART NUMBER | R7182 | C9273 | F7734 | C7197 | E5943 |
| PRICE | $1,295 | $1,595 | $1,895 | $2,095 | $2,395 |

## HP COMPAQ nx8220 SERIES

**HIGH-END PERFORMANCE IN A THIN AND LIGHT WIDESCREEN DESIGN**

The HP Compaq 8200 series Notebook PCs combines the processing and graphics power of a desktop with the mobility and convenience of a notebook. It offers users high performance processing and graphics capabilities in a travel friendly, thin and wide form factor. Mobile professionals will like the thin, sleek design combined with the advantages of a 15.4" widescreen display and desktop equivalent performance.

**BONUS Double Memory & Carry Case†**



Windows xp

| MODEL | nx8220† | nx8220† | nx8220† |
|---|---|---|---|
| PROCESSOR | P-M 750 | P-M 760 | P-M 770 |
| CLOCK SPEED | 1.8GHz | 2.0GHz | 2.1GHz |
| RAM | 512MB | 512MB | 1GB |
| HARD DRIVE | 60GB# | 80GB# | 80GB# |
| SCREEN | 15.4" WXGA | 15.4" WSXGA+ | 15.4" WSXGA+ |
| OPTICAL DRIVE | DVD±RW | DVD±RW | DVD±RW |
| WIRELESS LAN | 802.11a/b/g+BT | 802.11a/b/g+BT | 802.11a/b/g+BT |
| WARRANTY | 1 year | 1 year | 1 year |
| RENT* | $26.65/wk | $31.51/wk | $39.53/wk |
| PART NUMBER | F7736 | F7735 | S2985 |
| PRICE | $2,495 | $2,995 | $3,795 |

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

# HP DIGITAL PROJECTORS

## MP3222
### DIGITAL PROJECTOR



BONUS PRODUCTS! via redemption from HP^

Feature packed, only 1.7kg in weight
3000 hour lamp life in economy mode
DLP™ technology, 2000 lumens, XGA resolution, 2000:1 contrast ratio for outstanding image quality
Carry bag included
3 year projector warranty

Rent* $30.50/wk

P7947 **$2,899**

## MP3135
### DIGITAL PROJECTOR



BONUS PRODUCTS! via redemption from HP^

Unique space saving tower design
DLP™ technology, 1800 lumens, XGA resolution, 2000:1 contrast ratio for outstanding image quality
Carry bag included
Weight: 1.7kg
3 year projector warranty

Rent* $38.49/wk

S5462 **$3,695**

## VP6325
### DIGITAL PROJECTOR



BONUS PRODUCTS! via redemption from HP^

- 4000 hours lamp life
- DLP™ technology, 2000 lumens, XGA resolution, 2500:1 contrast ratio for outstanding image quality
- Weight: 3.5kg
- 2 year lamp warranty
- 3 year projector warranty

Rent* $33.66/wk

S3312 **$3,199**

## MP3135W
### DIGITAL WIRELESS PROJECTOR

Wireless connectivity or present powerpoint slides straight from a USB key.



BONUS PRODUCTS! via redemption from HP^

- PC-free presenting using storage memory card
- Unique space saving tower design
- DLP™ technology, 1800 lumens, XGA resolution, 2000:1 contrast ratio for outstanding image quality
- Carry bag included
- Weight: 1.7kg
- 3 year projector warranty

Rent* $45.92/wk

S3308 **$4,499**

## VP6315



**FEATURES:**
- Smarter versatility and portability with integrated handle
- Simple-to-use. Auto detects optimal setting for data, graphics or video
- 4000 hours lamp life
- DLP™ technology, 1600 lumens, SVGA resolution, 2000:1 contrast ratio for outstanding image quality
- Weight: 3.5kg
- 2 year lamp warranty
- 3 year projector warranty

Rent* $22.40/wk

S3311 **$1,999**

## XP8010



**FEATURES:**
- DLP™ Technology
- 2600 Lumens in brightness
- True XGA (1024 x 768) resolution
- Perfect for ceiling mounted applications
- High connectivity
- 3 year projector warranty

Rent* $55.36/wk

M0914 **$5,999**

***RENTSMART**
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**PLEASE NOTE:**
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**BONUS OFFER:**
Purchase selected commercial projectors (MP3222, MP3135, MP3135W & VP6325) between 01/09/05 & 31/10/05 and you can redeem the following bonus offers directly form HP by completing the claim redemption form. Terms and conditions apply. **Postage & Handling $29.95 apply.** Visit **www.hp.com.au/projectors** for full terms and conditions.

**HP Deluxe Travel Wheeled Case** - The Deluxe travel case protects and carries your mobile projector and notebook PC or mobile printer and accessories.

**Belkin Security Lock** - 2 metre, aircraft-grade, steel cable and includes a padlock, two keys, and nylon carrying bag for travel convenience. Allows for securing of laptop or projector via security slot.

invent

## HP DESKTOPS

## HP DX2000 MICROTOWER



- Intel 865GV Chipset
- Intel Celeron D 330 2.66GHz processor
- 256MB DDR PC3200
- 40GB HDD (5600RPM)#
- 48x/32x/48x CD-RW Drive
- 8 USB 2.0 ports (2 front & 6 rear)
- Integrated Intel PRO/100 network connection
- Keyboard & mouse included

**HP DX2000 PC WITH WINDOWS XP HOME**

Rent* $7.83/wk

P7049 **$699**

**HP DX2000 PC WITH WINDOWS XP PROFESSIONAL**

Rent* $8.95/wk

P7050 **$799**

***RENTSMART**

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## HP DX5150 MT & MICROSOFT OFFICE BASIC BUNDLE

- Athlon 64 3000+ processor
- 512MB RAM (2 X 256MB)
- 160GB SATA HDD (7200RPM)#
- ATI Radeon XPRESS 200G graphics chipset
- 16x DVD+/-RW drive
- Keyboard & mouse included
- Windows XP Professional

Microsoft Office Basic includes:

- Word 2003
- Excel 2003
- Outlook 2003

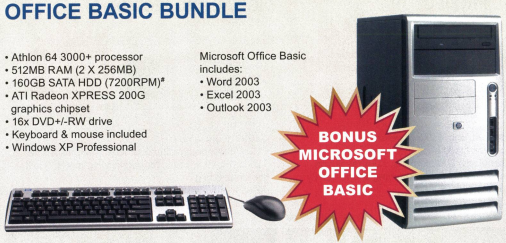



Image for illustration purposes only.

**HP DX5150 MICRO TOWER PC & MICROSOFT OFFICE BASIC EDITION**

Rent* $14.56/wk

S8178 **$1,299**

## HP DC7600 SMALL FORM FACTOR & ULTRA SLIM PCs

- Intel 945G Chipset
- Intel Pentium 4 531 3.0GHz Processor
- 512MB PC4200 RAM
- 80GB HDD (7200RPM)#
- CD-RW/DVD Combo Drive
- 8 USB 2.0 ports (2 front & 6 rear)
- Keyboard & mouse included
- Windows XP Professional



Image for illustration purposes only.



Small Form Factor PC pictured

**HP DC7600 SMALL FORM FACTOR PC**

Rent* $14.78/wk

S7140 **$1,319**

**HP DC7600 ULTRA SLIM DESKTOP PC**

Rent* $14.78/wk

S7142 **$1,319**

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

# IP ProLiant ML110G2

## HP ProLiant ML110G2

**4 3.0GHZ 1GB 2X80GB SATA HOT-PLUG SBS**

ll small businesses want to focus on improving their business rather than simply running it. If that's you, then you re ready for an HP ProLiant server. By employing the right server solution for your size of business, you can easily hare documents, internet, databases, software applications, printers and communicate via email. HP ProLiant ervers provide easy to use technology that increases productivity, saves your business money, minimises business sk, and lets you reclaim your leisure time for those more important things in life. And as the chosen partner of icrosoft®, ProLiant servers come pre-loaded with Microsoft® Small Business Server 2003, making them the ideal ut of the box' solution for any office.

### RODUCT FEATURES:

Intel® Pentium® 4 Processor 3.0GHz standard
(supporting Hyper-Threading Technology).
Multi Processor not supported
1GB PC3200 DDR SDRAM running at 400MHz, with
unbuffered standard ECC capabilities (4GB maximum)
Integrated 1024-KB Level 2 ECC cache
Intel® E7221 Chipset
2x80GB 7,200 RPM SATA Hot Plug Drives, 4 free
hotplug slots
48x IDE (ATAPI) CD-ROM Drive
Intel® 82541PI PCI Gigabit NIC (embedded) 10/100/1000
WOL (Wake on LAN)
Windows Small Business Server - Standard Edition with
5 CALs (pre-installed OEM version)
1 x parallel, 1 x serial, 1 x mouse, 1 x graphics,
1 x keyboard, 1 x network RJ-45, 5 x USB ports
(2 rear, 2 front panel, 1 internal for memory stick)
**Warranty:** 1 year limited warranty
(1 year parts/ 1 year labour/ 1 year on-site)



Windows Small Business Server 2003

intel inside pentium 4

**INDOWS SMALL BUSINESS SERVER STANDARD EDITION COMES WITH:**

Windows Server 2003
Exchange Server 2003
Windows SharePoint Services
Microsoft Shared Fax Service
5 client access licences, including Microsoft Outlook 2003 Client

Vindows Small Business Server 2003 delivers a powerful advantage to small businesses owners. A complete and ffordable network solution, it brings the power of big business technology to small companies. By simplifying your usiness operations and allowing you to make the most of your resources, Windows Small Business Server 2003 elps your company work smarter and more productively.

Rent* $19.04/wk

R8141 **$1,699**

### OPTIONS FOR HP PROLIANT ML110G2

#### MEMORY OPTIONS

1024MB of Advanced ECC PC3200 DDR SDRAM DIMM Memory Kit (1 x 1024MB)

Rent* $10.53/wk

Q3070 **$940**

512MB of Advanced ECC PC3200 DDR SDRAM DIMM Memory Kit (1 x 512MB)

N1788 **$410**

#### OPTICAL DRIVE OPTIONS

CD-RW/DVD-ROM Combo Drive Option Kit

K7926 **$205**

1.44MB Floppy Drive Option Kit

S2368 **$80**

#### HARD DRIVE OPTIONS

HP ProLiant Hot-Pluggable 160GB SATA 7200 RPM Drive

P8018 **$355**

HP ProLiant Hot-Pluggable 250GB SATA 7200 RPM Drive

Rent* $7.28/wk

Q3483 **$650**

#### WARRANTY OPTIONS

3 years next day on-site warranty upgrade

M6877 **$390**

3 years 4 hour on-site warranty upgrade

M6879 **$1,211**

#### *RENTSMART

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acer

## ACER NOTEBOOKS

### TRAVELMATE 4102WLMi WITH WIDESCREEN




Work with freedom and experience a brand new approach to productivity! The new TravelMate 4102 combines Intel Centrino technology featuring PCI Express, with a comprehensive feature set to offer one of the most practical notebooks available today.

- Intel Pentium M 740 1.7GHz
- 512MB DDRII RAM
- 15.4" CrystalBrite widescreen
- 80GB hard disk#
- DVD±RW Dual Layer Drive
- 3 x USB 2.0 ports
- 56Kbps modem
- 10/100 LAN
- WiFi 802.11b/g
- Windows XP Professional

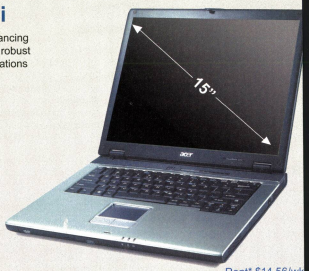
Rent* $24.56/wk

E0070 **$2,299**

### TRAVELMATE 2413WLCi

The TravelMate 2355 is the perfect partner for enhancing your efficiency and success with its combination of robust processing power, graphics capabilities, communications and dependable design.

- Intel Celeron M 370 1.5GHz
- 256MB DDRII RAM
- 15" XGA screen
- 40GB hard disk#
- DVD/CD-RW combo drive
- 3 x USB 2.0 ports
- Modem / LAN
- WiFi 802.11g with SignalUp Technology
- Windows XP Professional




Rent* $14.56/wk

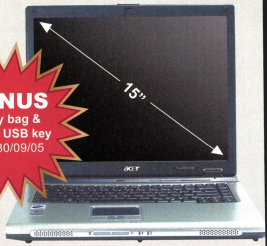
S8238 **$1,299**

### TRAVELMATE 4152LMi

The professionally balanced TravelMate 4152 is well designed to optimise your productivity and amplify success, combining solid processing and graphics capabilities, with wide ranging functionality.

- Intel Pentium M 740 1.7GHz
- 512MB DDRII RAM
- 15" XGA Screen
- 80GB hard disk#
- DVD±RW dual layer drive
- 3 x USB 2.0, firewire, S-Video out
- Modem / LAN
- WiFi 802.11g with SignalUp Technology
- Up to 5.5 hours of battery life
- Windows XP Professional

**BONUS**
**Carry bag & 128MB USB key**
Until 30/09/05




Rent* $22.40/wk

90189 **$1,999**

***RENTSMART**
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### BOOST YOUR WIRELESS CONNECTION WITH ACER SIGNALUP

**A breakthrough that boosts wireless performance by a minimum of 25%. Acer technology provides a more stable signal with higher quality wireless both outdoors and in difficult indoor environments.**

#Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

# HIGH PERFORMANCE COMPUTING AT AN AFFORDABLE PRICE




Image for illustration purposes only.

## AcerPower F3 CELERON PC

Intel Celeron 2.8GHz
256MB DDR533 RAM
80GB# SATA HDD (7200 RPM)
16X Dual Layer DVD+/-RW Drive
Speakers included
Windows XP Professional
17" LCD monitor

Rent* $16.80/wk

A6098 **$1,199**

## AcerPower F3 PENTIUM 4 PC

- Intel® Pentium 4 630 3.0GHz processor
- 512MB DDR533 DRAM
- 80GB# SATA HDD (7200 RPM)
- 16X Dual Layer DVD+/-RW Drive
- Speakers included
- Windows XP Professional
- 17" LCD monitor

Rent* $12.31/wk

A6084 **$1,499**

Accessible capacity of hard drive may be less due to pre-installed software and recovery partition.

## ACER 19" LCD MONITOR




- Response time: 20ms
- Maximum resolution: 1280 x 1024 @ 75Hz
- Brightness: 300cd/m²
- Contrast: 800:1
- Pixel Pitch: 0.294mm
- Analogue input

### PRODUCT FEATURES

- Tilt base
- High brightness & contrast ratio
- True colour supported
- Large viewable area
- Auto scaling function

R9022 **$519**

### *RENTSMART

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TARGUS®

Making Your Mobile Life Easier®

## GET MOBILE...GET TARGUS

### VALUE BUNDLE



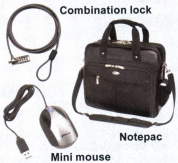

S5218 **$165**

### MOBILE OFFICE BUNDLE




S2607 **$189**

### CORPORATE BUNDLE




A5089 **$199**

**PLEASE NOTE:**
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## GLOBAL EXECUTIVE CASE RANGE



BACKPACK CASE DELUXE CASE UNIVERSAL CASE

All cases have a top loading compartment that fits notebooks with up to 15.4" screens. A padded interior compartment, coupled with the patented SafePORT Air Cushion System and the Dome Protection System ensure superior protection. Each case unites original specialty items such as a hidden water bottle holder and retractable blue light with amenities including a removable CD/DVD sleeve and accessory pouch. The lightweight and rugged design made with scratch resistant lining and water resistant fabric make them ideal for executives requiring comfort, functionality and protection. The Deluxe Case has an extra zippered file section while the Universal also includes a compartment for a projector.

| | | | | | |
|---|---|---|---|---|---|
| E1182 | BACKPACK | **$139** | E0407 | CASE | **$99** |
| C9272 | DELUXE CASE | **$139** | D8249 | UNVERSAL CASE | **$165** |

## MICE

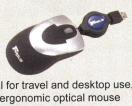
### ULTRA MINI 5 BUTTON OPTICAL MOUSE




Ideal for travel, this compact optical mouse with USB retractable cable is the world's smallest 5 button mouse!

40655 **$35**

### WIRED MINI MOUSE



Ideal for travel and desktop use, this ergonomic optical mouse with USB retractable cable has a 3 button scroller wheel design suitable for left and right hand users.

C9388 **$35**

### WIRELESS OPTICAL MOUSE/ POINTER/PRESENTER



Ideal for working on the road and making wireless presentations from your notebook of up to 15m away, this mouse/presenter also has a laser pointer for your presentations.

M9225 **$109**

## POWER

### UNIVERSAL 70 WATT AC POWER ADAPTOR




Leave your current power adaptor at the office and use the Mobile 70 watt at home.

N5645 **$149**

### UNIVERSAL 70 WATT AUTO/AIR POWER ADAPTOR




Power your mobile devices wherever you go, in your car, on an aeroplane, boat or 4WD.

N2037 **$155**

### UNIVERSAL 70 WATT AC/DC POWER ADAPTOR




Capable of AC or DC Power Input Works at home, office, car, boat, or aeroplane.

N2257 **$199**

# BELKIN ACCESSORIES

## CONOMY 2 PORT KVM WITH CABLES ATTACHED, M, USB & AUDIO SUPPORT



ffers a complete compact solution with audio support
nd built-in cables
Features a manual port selector and LED indicators
Video resolutions up to 2048 x 1536
Supports multiple operating systems
Requires no power supply

N8931 **$85**

## ECONOMY 4 PORT SWITCH - PS/2 ONLY, ALL CABLES INCLUDED, 1.8M



- Supports video resolutions up to 2048 x 1536 @ 85Hz through a 400MHz bandwidth
- Features hot key switching and manual push-button port selection
- 10 second auto-scan function
- 2 year warranty and technical support

D3159 **$149**

## ELKIN WIRELESS RECHARGEABLE MOUSE



Offers a quick recharge between long operation cycles
Delivers superior optical quality without wires
Ergonomic design offers left or right handed use
Includes 3 one touch hot keys
Includes long lasting NiMH rechargeable batteries

S2567 **$53**

## WIRELESS KEYBOARD & OPTICAL MOUSE BUNDLE



- Slender design, easy to connect
- 14 hot keys for one touch access to the internet and multimedia functions
- Works seamlessly for right and left hand users
- 2 convenient LEDs for keyboard and mouse usage

K8276 **$59**

## INI OPTICAL MOUSE WITH ETRACTABLE CORD



Offers precision tracking
Provides ergonomic comfort in planes, trains, cars, and buses
Features a compact and light design
Ideal for mobile users
With retractable cord for easy packing
Available in regular and spectacular lighted version

R9463 **$35**

## NOTEBOOK SECURITY LOCK, WITH PADLOCK



- Secures Notebooks and other devices
- Features a unique locking device
- Includes a rugged yet lightweight 2 metre galvanised steel cable
- Comes with Belkin's lifetime warranty

P9093 **$36**

## SOHO SERIES UPS SERIAL & USB 650VA - $100,000 WARRANTY



In a power outage or brownout, the SOHO Battery Backup automatically switches your computer to battery backup power and gives you the time to save open files and safely power off. As the leading developer of power protection solutions, Belkin engineers rigorously test all products to ensure your equipment will be safe from harmful electrical disturbances.

### BENEFITS

- Provides up to 30 minutes of backup time
- Battery capacity load: 650VA (390W)
- 3 battery backup sockets, 3 surge-protected-only sockets
- USB and Serial communication ports
- Shuts down your system and documents safely with included Belkin Power Management Software
- Provides DSL/broadband protection (RJ11 ports 1-in, 1-out)
- Filters electromagnetic/radio frequency interference (EMI/RFI)
- Provides quality surge protection with 1620J
- Comes with a Belkin 3 year product warranty and $100,000 connected equipment warranties

M0848 **$299**

**PLEASE NOTE:**
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Not all items stocked in store but available for pick-up/delivery.

# LINKSYS®

A Division of Cisco Systems, Inc.

## A LEADER IN WIRELESS NETWORKING

### NETWORK STORAGE LINK FOR USB 2.0 DISK DRIVES - NSLU2



- Connects USB 1.1 or 2.0 disk drives and flash disks directly to your network
- Share music, video, or data files with managed access by user name or group
- Integrated file server - access your files from the internet
- Built-in disk utilities - format, backup and scandisk

P8510 **$159**

### WIRELESS-G RANGE EXTENDER - WRE54G



- The easiest way to expand your wireless network's coverage
- Save on wiring costs - no wired connection to your network necessary
- Extend your wireless signal into hard-to-reach areas
- Compatible with both Wireless-G and Wireless-B networking clients

P9344 **$129**

**PLEASE NOTE:**
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### COMPACT WIRELESS - G BROADBAND ROUTER - WRT54GC



- All-in-one Internet-sharing router, 4 port Switch, and Wireless-G (802.11g) Access Point
- Shares a single Internet connection and other resources with Ethernet wired and Wireless-G and B devices
- Compact form factor fits in anywhere
- High security: Wi-Fi Protected Access™ (WPA/WPA2 Personal), wireless MAC address filtering, powerful SPI firewall

S6818 **$129**

### WIRELESS-G BROADBAND ROUTER - WRT54G



- All-in-one wireless internet router, allows you to share your broadband connection wirelessly, 802.11G wireless, 4 port 10/100 Ethernet switch
- Wireless data rates up to 54Mbps
- Shares a single internet connection and other resources with Ethernet wired and Wireless-G clients
- Advanced wireless security with 128 bit WEP encryption, MAC or IP address filtering
- 3 year manufacturer limited warranty

H9739 **$129**

### WIRELESS-G BROADBAND ROUTER WITH SRX - WRT54GX



- Internet-sharing router, 4 port switch, with a built-in speed and range enhanced Wireless-G (802.11g) Access Point
- Shares a single Internet connection and other resources with Ethernet wired, Wireless-G, -B, and other SRX devices
- New SRX technology: the farther away, the more advantage up to 8 times faster than standard Wireless-G (802.11g)
- SRX also increases wireless range by up to 3 times and reduces dead spots in coverage area

R8671 **$299**

### ADSL2 USB, ETHERNET MODEM - ADSL2MUE



- Harness the full potential of the Internet with the Linksys ADSL2 Modem
- High-speed ADSL modem gives you a fast, "always on" connection to the Internet
- Up to 12Mbps download speeds, 200 times faster than dial-up analog modems
- Shares your existing telephone lines to connect to the Internet, without tying up the phone
- Connects to your PC over 10/100 Ethernet or USB

R9752 **$95**

### 4 PORT ADSL2 GATEWAY SWITCH - AG241



- High speed ADSL Modem
- Built-in router and 4 port switch
- Jump start your Ethernet network and share the Internet throughout your household
- Advanced firewall and security features protect your PCs, your data, and your family
- Compatible with both ADSL1 or ADSL2 standards

R8981 **$155**

### WIRELESS G ADSL GATEWAY - WAG54G



- ADSL modem with 4 x 10/100 switch ports
- Wireless 802.11G 54MB access point, supports both 11MB & 54MB clients
- Wireless security includes WEP, WPA & 802.1x
- Powerful stateful packet firewall with denial of service attack prevention
- VPN server, 5 VPN tunnels - also supports VPN pass-through
- 3 year manufacturer exchange warranty

M5307 **$189**

# BROADBAND SOLUTIONS FOR HOME & SMALL BUSINESS

## NB5PLUS4W ADSL2+ MODEM ROUTER WITH BONUS LSV40 USB VOIP PHONE




- Versatile ADSL2+ modem router with USB, 4 Ethernet ports and 54Mbps Wireless Access Point
- Advanced security firewall (SPI) and VPN pass-through
- Access Point features WEP and WPA wireless security
- Includes a Quality of Service (QoS) function to prioritise particular types of data making it ideal for VoIP-use
- Includes bonus NetComm LSV40 USB VoIP Phone and includes VoIP service, VoIP telephone number and Free voicemail box

†Offer ends 30 September 2005 or while stocks last.

S6961 **$199**

## NP210 ETHERNET OVER POWER ADAPTOR KIT



NetComm HomePlug is an Ethernet Over Power adaptor that allows you to network up to 15 devices using your home or office power supply. Simply plug the NetComm HomePlug into a power point and connect your device with an Ethernet cable - it really is that easy†.

- Create or extend a Local Area Network (LAN) using your home or office power wires
- Connect a broadband modem and extend your Internet coverage to any room with a power point
- Connect your gaming consoles (xBox, PS2) to the Internet for online gaming
- Overcome wireless "dead zones" or connect a Wireless Access Point into a HomePlug for wireless range extension

† All HomePlugs must be on the same electrical circuit

R9904 **$189**

## NB5PLUS4 ADSL2+ MODEM ROUTER



Versatile ADSL2+ modem router with USB and 4 Ethernet ports
Advanced security firewall (SPI) and VPN pass-through
Supports ADSL, ADSL2 and ADSL2+
Includes a Quality of Service (QoS) function to prioritise particular types of data making it ideal for VoIP-use

S1159 **$149**

## NB5 ADSL2/2+ MODEM ROUTER



- USB port and single Ethernet port
- Advanced security firewall (NAT, SPI and DoS support)
- VPN pass-through
- Includes a Quality of Service (QoS) function making it ideal for VoIP
- Supports Universal Plug and Play (UPnP)
- Easy installation and set-up

P7335 **$125**

## ANALOGUE TELEPHONE ADAPTOR (ATA) V100LS^



- Designed to connect a standard telephone handset
- Delivers quality, reliable, real-time Internet voice calls
- Ideal for residential and small business users
- Can significantly reduce long distance call charges

^Product uses NetComm hardware and includes $5 credit for use with VoIP service from MyNetFone.

R6466 **$129**

## NETCOMM NB5540 WIRELESS G ROUTER + 4 PORTS




The NB5540 wireless router combines an integrated 54Mbps Wireless Access Point, router and 4 port 10/100 switch. It features an advanced SPI Firewall with 128Bit Wireless Encryption, and supports automatic VPN pass-through. Alternatively you can use the five built-in IPSec endpoints to join to other office networks. For existing 11Mbps wireless networks, the NB5540 is also backward compatible.

J8540 **$99**

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NETGEAR™

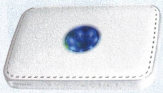
# MAKE A SMART DECISION ON MANAGED SWITCHES

A smart switch has many of the benefits of a managed switch without the complexity or cost of a fully managed switch. With a smart switch, you can monitor ports, configure trunks, and set prioritisation, all with an intuitive Web interface. A smart switch has more capability than an unmanaged switch, but not all that of a fully managed switch. For example, a smart switch can configure ports, set up trunking, and even virtual LANs (VLANs), but it cannot participate in SNMP. The default settings match what you would find in an unmanaged switch, so you can use them right out of the box without even touching the management features.

The Smart Switches ship with the SmartWizard Discovery program that will discover the switch on your network, enabling you to connect to the switch via your web browser. Configuration after that is through an intuitive web browser interface.

| Model | FS726T | FS726TP | FS750T2 | GS716T | GS724T | GS748T |
|---|---|---|---|---|---|---|
| 10/100 Ports | 24 | 24 | 48 | - | - | - |
| 10/100/ 1000 Ports | 2 | 2 | 2 | 16 | 24 | 48 |
| Module Slots | 1 | 2 | 2 | 2 | 2 | 4 |
| QoS/VLAN/DHCP/ Port Trunking | Yes | Yes | Yes | Yes | Yes | Yes |
| Throughput (Gbps) | 8.8 | 8.8 | 13.6 | 32 | 40 | 48 |
| PoE (Power over Ethernet) | No | 12 | No | No | No | No |
| Warranty | Limited 5 years | Limited 5 years | Limited 5 years | Limited 5 years | Limited 5 years | Limited 5 years |
| Rent* | | $8.99/wk | $10.86/wk | $8.91/wk | $11.93/wk | $23.19/wk |
| Part # | R0482 | S7039 | N3143 | S7139 | N3147 | Q9557 |
| | $498 | $749 | $969 | $795 | $1,065 | $2,069 |

## RANGVEMAX WIRELESS ACCESS POINT - WPN802



- Extends your Ethernet network with high-speed wireless access, up to 108Mbps
- RangeMax™ Smart MIMO (Multi-In, Multi-Out) technology navigates through possible interference
- Fully compatible with Wi-Fi certified 802.11b, 802.11g, and SuperG® devices
- Security through WPA-PSK, MAC address authentication and up to 128-bit WEP data encryption
- SmartWizard™ Installation Assistant

**WPN802 "RANGEMAX" WIRELESS ACCESS POINT**
A6081 **$249**

**WPN824 "RANGEMAX" WIRELESS G ROUTER + 4 PORTS**
R5401 **$205**

**WPN511 "RANGEMAX" WIRELESS G NOTEBOOK ADAPTER**
R4068 **$109**

**WPN111 WIRELESS G "RANGEMAX" USB ADAPTER**
Q3512 **$145**

**WPN311 WIRELESS G "RANGEMAX" PCI ADAPTER**
R4066 **$109**

***RENTSMART**
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## STORAGE CENTRAL




**SC101**
Store your files, music, video, games, photos, and financial records in one central location, accessible as a letter drive

- Share files easily with everyone on the network, while keeping your personal files private
- Safeguard your valuable files by keeping real time duplicate copies - automatically, effortlessly
- Setup and configuration are a breeze
- Advanced Backup software included
- Easy upgradeability through IDE drives^
- Connect via RJ-45 Ethernet

^ Hard drives must be purchased separately.

34265 **$229**

## PROSAFE™ VPN FIREWALL 25




**FVS124G**

- Dual 10/100 WAN Ports and 4 Gigabit LAN Ports
- Up to 25 simultaneous IPSec VPN tunnels
- True Firewall with Stateful Packet Inspection (SPI) and Intrusion Detection
- 168-bit 3DES, 256-bit AES IPSec encryption
- SNMP Manageable - compatible with Netgear ProSafe Network Management Software NMS100
- Bundled with ProSafe VPN Client software - single user license
- VPNC Certified

S7022 **$369**

D-Link®
Building Networks for People

# NETWORKING SOLUTIONS

## 108Mbps WIRELESS ROUTER WITH MIMO DI-634M

Enhanced wireless coverage with smart antenna technology
Up to 8x better wireless range coverage**
Wireless speeds up to 108Mbps*
Advanced security schemes
Backward compatible with 802.11b/g devices




C9271 **$289**

## 108Mbps WIRELESS PCI ADAPTER WITH MIMO DWL-G520M

- Enhanced wireless coverage with smart antenna technology
- Up to 8x better wireless range coverage**
- Wireless speeds up to 108Mbps*
- Advanced security schemes
- Backward compatible with 802.11b/g devices




C5204 **$169**

## 108Mbps WIRELESS PCMCIA CARD WITH MIMO DWL-G650M

Enhanced wireless coverage with smart antenna technology
Up to 8x better Wireless range coverage**
Wireless speeds up to 108Mbps*
Advanced security schemes
Backward compatible with 802.11b/g devices




C7252 **$139**

## 108Mbps WIRELESS GAMING ROUTER WITH GIGABIT - DGL-4300

Optimised gaming experience
Up to 108Mbps^ 802.11g wireless connectivity
4 gigabit Ethernet ports
Customisable settings for games and applications



## GAMING ROUTER WITH GIGABIT DGL-4100

- Optimised gaming experience
- 4 gigabit Ethernet ports
- Customisable settings for games and applications



*Maximum wireless signal rate derived from IEEE Standard 802.11g specifications. Actual data throughput will vary.

L6109 **$349**

C9274 **$299**

## 5 PORT 10/100/1000 UN-MANAGED SWITCH DGS-1005D



K8301 **$129**

## 8 PORT 10/100/1008 UN-MANAGED SWITCH DGS-1008D



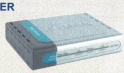
K8853 **$169**

## 16 PORT 10/100/1000MBPS COPPER GIGABIT ETHERNET SWITCH DGS-1016D



Q9448 **$499**

## DSL- 502T ADSL USB/ETHERNET COMBO MODEM/ROUTER



R6714 **$119**

## DWL-G730AP




**Portable Wireless Connectivity**
The DWL-G730AP is a portable and convenient wireless solution for the traveling business person delivering 802.11g wireless connectivity with a maximum wireless signal rate of up to 54Mbps. Use it in conference rooms, hotel rooms, or even at hotspots.

R7529 **$145**

**54Mbps DESKTOP BUNDLES**
**DI-524 + DWL-G510 BUNDLE**

S1177 **$149**

**AIRPLUS XTREMEG DESKTOP BUNDLE**
**DI-624 + DWL-G520 BUNDLE**

S1284 **$179**

**54Mbps NOTEBOOK BUNDLE**
**DI-524 + DWL-G630 BUNDLE**

S1156 **$149**

**108Mbps NOTEBOOK BUNDLE**
**DI-624 + DWL-G650**

S1285 **$179**

* Maximum wireless signal rate derived from IEEE standard 802.11g. Actual data throughput will vary. Network conditions and environmental factors lower actual data throughput rate.

** Up to 108Mbps when operating with other wireless 108G MIMO and AirPlusXtremeG products, up to 8x signal range when operating with other wireless 108G MIMO products.

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# SERVERLINK

## INTELLIGENT KVM SOLUTIONS

### SERVERLINK ELITE KVM SWITCHES



The ServerLink Elite KVM switches allow you to control your servers with a single keyboard monitor and mouse. Using high-density connections, these 8 and 16 port switches use only 1U of rack space making them the ideal choice for any server room where space is at a premium.

**8 PORT ELITE KVM**
Including 8 x 2m Cables
Rent* $7.83/wk
P2748 **$699**

**16 PORT ELITE KVM**
Including 16 x 2m Cables
Rent* $11.19/wk
P2749 **$999**

### SERVERLINK IP REMOTE ACCESS DEVICE



Access your servers from anywhere in the world! The ServerLink IP allows network administrators to manage, configure, troubleshoot and even reboot remote servers from any web browser.

Rent* $8.86/wk
Q5544 **$774**

***RENTSMART**
The figures quoted are based on a per week basis over 3 years. Terms and conditions apply.

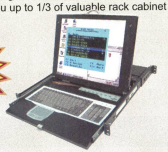
**PLEASE NOTE:**
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### SERVERLINK LCD KVM RACK DRAWERS

The ServerLink KVM Console drawers are designed for applications where space is at a premium or CRT displays are undesirable. With a 15" or 17" TFT LCD screen, keyboard, touchpad and integrated KVM switch housed in an industry standard 19" 1U-height rack drawer, these LCD KVM switches save you up to 1/3 of valuable rack cabinet space.

- Modular design allows for easy expansion
- "A" Grade 15" or 17" LCD panel with zero dead pixels
- Supports PS/2 PC, USB PC, USB Mac & USB SUN platforms
- Locking mechanism locks the drawer when pulled out and pushed in
- Keyboard and mouse can be hot plugged at any time
- Replaceable Keyboard and Touch Pad
- Standard 19" 1U rack drawer
- Cables sold separately - see below

PS/2 & USB



| Model | LKS-101H | LKS-801C | LKS-1601C | LKS-1017H | LKS-8017C | LKS-16017C |
|---|---|---|---|---|---|---|
| No. of Computer Ports | 1 | 8 | 16 | 1 | 8 | 16 |
| LCD Panel Size | 15" | 15" | 15" | 17" | 17" | 17" |
| KVM Platform Support | N/A | PS/2 & USB | PS/2 & USB | N/A | PS/2 & USB | PS/2 & USB |
| Maximum Resolution | 1024 x 768 | 1024 x 768 | 1024 x 768 | 1280 x 1024 | 1280 x 1024 | 1280 x 1024 |
| Rent* | $24.56/wk | $27.76/wk | $31.55/wk | $27.76/wk | $30.50/wk | $34.71/wk |
| Part Number | H2100 | S6917 | S6919 | P2058 | S6920 | S6922 |
| Price | $2,299 | $2,599 | $2,999 | $2,599 | $2,899 | $3,299 |

### CABLES REQUIRED FOR SERVERLINK LCD - USE PS/2, USB OR COMBINATION OF BOTH

H8782 1.8m LCD KVM Cable - PS2/VGA **$29**

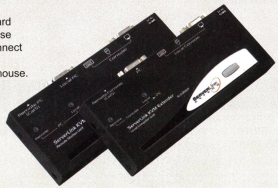
P8157 1.8m LCD KVM Cable - USB/VGA **$29**

H8784 6m LCD KVM Cable - PS2/VGA **$59**

P8159 5m LCD KVM Cable - USB/VGA **$59**

### SERVERLINK KVM EXTENDER

The ServerLink KVM Extenders allow you to use standard Cat5 cabling to extend your monitor, keyboard and mouse up to 150m away in a remote location. You can also connect a second computer at the remote location, giving you control of both computers. Supports PS/2 keyboard & mouse.



- Control a single computer locally and remotely
- Uses Cat5/Cat5E/Cat6 UTP cabling
- Adjustable Video compensation for optimum signal
- Supports video resolution up to 1600 x 1200

S6923 SERVERLINK KVM EXTENDER FOR PS/2 **$499**

# USB - STORAGE & CONNECTIVITY

## COMSOL USB 2.0 DESKTOP HUBS

nstantly add high-performance USB 2.0 peripherals to your desktop computer. Its stylish aluminium casing and ultra compact design makes the Comsol USB 2.0 Desktop Hub the perfect solution o extend your computer's high-speed USB connectivity.




Hi-Speed USB 2.0 certified
Blue LED to indicate power status
Supports plug & play and hot-swapping
Data transfer speeds up to 480Mbps
No software required for easy installation

S8234 4 PORT **$39**

S8232 7 PORT **$59**

### COMSOL USB VOIP PHONE




SKYPE ready - talk for free with other Skype users
Works with most leading VoIP providers
Make huge savings on local, standard and international calls
Ideal for the mobile traveller
Echo cancellation and noise reduction

C5200 **$69**

### COMSOL USB BLUETOOTH ADAPTER

- Enable Bluetooth connectivity on a notebook or desktop PC
- Bluetooth v1.2 certified
- Ideal for mobile phones, PDAs, headsets, printers etc.
- Operation range up to 40m
- WIDCOMM Bluetooth for Windows connectivity software



S6934 **$69**

### COMSOL USB 2.0 4 PORT MINI HUB

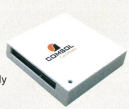
Hi-Speed USB 2.0 certified
Ultra compact for portability
Ideal for mobile notebook users
Transfer speeds up to 480Mbps



S1276 **$29**

### COMSOL USB 2.0 CARD READER 27-IN-1

- Hi-Speed USB 2.0 certified
- Supports most popular memory card formats
- Transfer files by user friendly drag-and-drop
- Supports plug & play and hot-swapping



R5964 **$39**

### COMSOL USB 2.0 SD CARD READER

Hi-Speed USB 2.0 certified
Supports SD, Mini SD, MMC, RSMMC, TransFlash
Transfer files by user friendly drag-and-drop
Supports plug & play and hot-swapping




S8233 **$19**

### SERVERLINK STAR 2 PORT USB KVM

- Control 2 USB computers with a single USB keyboard, USB mouse and monitor
- Audio & Mic Switching for multimedia applications
- Select via hotkey control or push buttons
- Built-in 1.5m KVM combo cables
- PS/2 only and PS/2 + USB combo models also available



Q5540 **$89**

## COMSOL USB 2.0 FLASH DRIVES

flashIT 2



- Hi-Speed USB 2.0 certified
- Password security feature
- True plug & play
- PC & Mac compatible

S3103 256MB **$49**

S3104 512MB **$79**

S3105 1GB **$149**

## CARDBUS ADAPTERS



- Instantly add High-Speed USB 2.0 ports or IEEE1394 FireWire ports to your notebook
- Quick & easy installation - ideal for any mobile executive
- Hot-pluggable with full Plug-and-Play support
- Supports 32 bit CardBus PC Card type II slots

N2270 **2 Port USB 2.0** **$55**

N2272 **3 Port FireWire** **$64**

P2062 **4 Port Combo** **$99**

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LACIE

# STORAGE SOLUTIONS

## EXTERNAL LIGHTSCRIBE DVD BURNER




S8047



R4036

Create your own fabulous custom designs with crisp text, graphics and photos, which you can add to again and again.

- Easily burns professional labels
- Convenient - no need for a printer
- Professional quality laser precision and detail

**LaCie DL + LightScribe**
**16x DVD±RW - USB 2.0**

S8047 **$209**

**LaCie d2 DL + LightScribe**
**16x DVD±RW - USB 2.0 + Firewire**
**(Includes PC/Mac software)**

R4036 **$289**

**LACIE FIREWIRE 800 PCI CARD (3 PORTS)**



J6551 **$129**

***RENTSMART**
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## d2 EXTERNAL HARD DISK DRIVES



LaCie d2 drives have been designed for professional users in mind. Beyond the fact that they are robust, lightweight, fast cooling and noise free, these drives have unique features such as Kensington cable lock slot, autoswitch power on/off with your computer and are rackmountable in 19" rack.

**250GB d2 EXTREME**
**USB/FIREWIRE/FW800**

Q0363 **$459**

**500GB d2 BIGDISK**
**USB/FIREWIRE/FW800** Rent* $8.50/wk

M1506 **$759**

**1000GB d2 BIGGERDISK**
**USB/FIREWIRE/FW800** Rent* $16.75/wk

M2819 **$1,495**

## SLIM EXTERNAL LIGHTSCRIBE DVD BURNER




- Multi-format, double layer recording
- Hi-Speed USB 2.0 interface
- Store 8.7GB of photos, MP3s, videos
- Comes with PC burning software
- USB 2.0 Bus powered

S8317 **$329**

## SAFE MOBILE DRIVES USB 2.0 & FINGERPRINT ACCESS




The LaCie SAFE Mobile Hard Drive guards your files thanks to biometric technology - fingerprint recognition grants access to its contents. Once registered, simply swipe your finger over the sensor and you will be automatically recognised as an authorised user - enabling the drive to unlock.

- Up to 5 user profiles, 10 fingerprints
- Hi-Speed USB 2.0 bus-powered
- Plug & play - no installation required

**40GB SAFE MOBILE DRIVES**
**USB 2.0 & FINGERPRINT ACCESS**

S7018 **$289**

**80GB SAFE MOBILE DRIVES**
**USB 2.0 & FINGERPRINT ACCESS**

S7019 **$389**

## Porsche EXTERNAL MOBILE DRIVES



**NB: The key is not included**

- Ultra-lightweight, only 200g
- AC adapter free
- BUS powered via USB 2.0 or Firewire

**40GB Porsche EXTERNAL**
**USB 2.0 & FIREWIRE MOBILE DRIVE**

S2458 **$229**

**80GB Porsche EXTERNAL**
**USB 2.0 & FIREWIRE MOBILE DRIVE**

S1929 **$339**

^Total access capacity varies depending upon operational environment

# Maxtor

## PC, NETWORK & SERVER STORAGE SOLUTIONS

### MAXTOR ONETOUCH II SMALL BUSINESS EDITION SERVER BACK UP - 200GB NATIVE / 300GB COMPRESSED^

**SIMPLE BACKUP FOR A SMALL BUSINESS SERVER**

Designed for the small business, the **Maxtor OneTouch II, Small Business Edition** installs easily and includes a simple Wizard interface for setting up unattended, automated backup schedules, drive management, security and backup settings, and file restoration.

Specifically developed for the small business server, comprehensive backups include operating system, settings, updates, applications, databases, address books, emails, documents and even open files!

You can even receive status updates via email or a simple desktop icon, and know that your backup is working - wherever you are.

^Compression assumes 3:2 compression ratio. Actual compression may vary dependent on type of data.



Rent* $8.95/wk

S4043 200GB **$799**

### MAXTOR SHARED STORAGE DEVICE



2 USB ports let you add shared network printers or external storage
Access files from multiple PCs simultaneously
You can set access privileges and keep selected folders private
With Maxtor exclusive Drag and Sort™ technology, you can instantly organise files by dragging them from your desktop PC to the Maxtor Shared Storage Drive
With its sleek, anodised aluminium shell and compact size, the Maxtor Shared Storage Drive easily fits anywhere in your home or small office
1 year warranty

R7907 200GB (USB 2.0) **$399**

Q1270 300GB (USB 2.0) **$499**

### MAXTOR ONETOUCH II™ - SMART STORAGE WITH PUSH-BUTTON BACKUP



Just press the button and your files are backed up in one simple step. Faster than CD. Faster than a floppy. Faster than removable cartridge systems. Space for your photos, videos, graphics, music, documents and more. It connects to FireWire or USB ports on a PC or Mac. It backs up with the Maxtor OneTouch™ button or runs automated backups using the included software, Dantz® Retrospect® Express. And you can customise the button to launch any application. Powerful, yet simple backup. Fast, flexible, huge capacity.

R3323 100GB (USB 2.0) **$229**

R3322 200GB (USB 2.0 + FIREWIRE) **$349**

Q3145 250GB (USB 2.0 + FIREWIRE) **$399**

Q3146 300GB (USB 2.0 + FIREWIRE) **$449**

### MAXTOR PERSONAL STORAGE 3100



**THE EASY ECONOMICAL WAY TO ADD STORAGE**

The Maxtor Personal Storage 3100 external hard drive provides instant storage to hold digital photos, music and data files. Ideal for the home and office, it's simple to install - just plug the external drive into an available USB port on your Windows PC and immediately get up to 80GB of extra space. Use the extra capacity to free up the space on your PC or to add more of your favorite files - the 80GB drive can hold up to 75,000 digital photos (JPEG normal) or up to 1650 hours of digital music (MP3).

The Personal Storage 3100 offers a dependable Maxtor hard drive for easy add-on storage to hold your important documents and precious memories. It works with both the fast USB 2.0 interface and USB 1.1.

**FEATURES**

- Easy installation
- USB 2.0 & 1.1 compatible
- USB 2.0 up to 40 times faster than USB 1.1
- Compact design
- Powered by a dependable Maxtor® hard drive
- Windows PC compatible

R3509 80GB **$149**

**^RENTSMART**

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Seagate

# SEAGATE EXTERNAL HARD DRIVES

## 5GB POCKET HARD DRIVE USB 2.0



The Seagate 1" external hard drive is the biggest small hard drive on the planet, with up to 5GB capacity. Breaking traditional cost/performance barriers, this innovative solution is available in a cool looking, USB 2.0 bus powered design. This 1" external drive is optimised to deliver high performance, low power consumption and reliability in a compact physical package.

### APPLICATIONS

- Robust design and high shock tolerance enable mobility in demanding operating environments
- Best solution for highly portable data transfer
- Great for carrying music, photos and business files
- One year manufacturer warranty

Q3001 **$249**

## #BONUS BUNDLE

Purchase either a Seagate external hard drive 3.5" or a Seagate portable drive 2.5" (Part No: S7107, S7108, S7109, S7110 or S7111) and receive bundled a BONUS: MSI StarCam 370i. Offer available until 30/09/05 or while stocks last.

### *RENTSMART

The figures quoted are based on a per week basis over 3 years. Terms and conditions apply.

### PLEASE NOTE:

All purchases subject to terms & conditions and returns policy. Delivery charges may apply. Not all items stocked in store but available for pick-up/delivery.

## EXTERNAL HARD DRIVE 3.5" 7200 RPM FIREWIRE/USB 2.0




### HIGH CAPACITY, AMAZING PERFORMANCE

These high capacity drives make it easy to store and backup your data. You can safely store business files, movies and photos, the latest games, your favourite music and more. And the interlocking design lets you securely expand your Seagate storage.

### ENGINEERED FOR HIGH PERFORMANCE

7200 RPM drive with 8MB cache and whisper quiet motor lets you effortlessly store and work with massive amounts of data.

### BUILT FOR SAFETY AND SECURITY

Seagate hard drives are safeguarded by built-in self monitoring technology that continuously checks your hard drive for data safety and drive performance. SeaTools diagnostic software is included.

### WORRY FREE, ONE YEAR WARRANTY

Warranty covers all parts and labour.

### DRIVE SPECIFICATIONS

- 8MB cache
- 7200 RPM
- 350 Gs non-operating shock resistance
- Mac and PC compatible

| | | |
|---|---|---|
| S7107 | 200GB (USB 2.0+FireWire) | **$349** |
| S7108 | 300GB (USB 2.0+FireWire) | **$449** |
| | Rent* $6.71/wk | |
| S7109 | 400GB (USB 2.0+FireWire) | **$599** |

## PORTABLE DRIVE 2.5" EXTERNAL 5400 RPM USB 2.0




### EXCEPTIONAL PORTABILITY AND PERFORMANC

Enjoy easy storage and access of large digital music, photo, video, data and multimedia files both on the des and on the go.

### ENGINEERED FOR HIGH PERFORMANCE

This 5400 RPM hard drive features a whisper quiet SonicSoft FDB motor, and delivers 50 percent more performance than 4200 RPM drives - with no increase in power consumption. You get higher speed while conserving battery life.

### FAST AND EASY

Supports speeds up to 480Mbps, is hot swappable an powered by the USB bus - there's no need for power cords or adapters.

### BUILT FOR SAFETY AND SECURITY

Seagate hard drives are safeguarded by built-in self monitoring technology that continuously checks your hard drive for data safety and drive performance. SeaTools diagnostic software is included.

### WORRY FREE, ONE YEAR WARRANTY

Warranty covers all parts and labour.

### DRIVE SPECIFICATIONS

- 2MB cache (40GB) / 8MB cache (100GB)
- 5400 RPM
- 5000 Gs non-operating shock resistance
- Mac and PC compatible

| | | |
|---|---|---|
| S7110 | 40GB | **$249** |
| S7111 | 100GB | **$499** |

SanDisk®

## STORE YOUR WORLD IN OURS

## USB KEYS
### CRUZER MICRO

Cruzer Micro is an incredibly small USB Flash Drive (UFD) that connects to a computer's USB port. With capacities ranging from 256MB to 2GB, users can easily store their key documents, pictures, music and video clips on a Cruzer Micro and transfer them to another computer with a USB port. The new version of Cruzer Micro with Skins provides the capability to change the colour of your Cruzer with new covers and caps.

- Available in 4 capacities: 256MB, 512MB, 1GB and 2GB
- Dimensions: 7.9mm x 18.95mm x 52.2mm (H x W x L)
- Stylish, metal casing with changeable coloured skins and caps **
- Hi-Speed USB 2.0 certified (backwards compatible with all USB 1.1 ports)







** Available for new version of Cruzer Micro with skins only.

| | | |
|---|---|---|
| P0698 | 256MB USB 2.0 | $49 |
| P0699 | 512MB USB 2.0 | $85 |
| S2289 | 1GB USB 2.0 | $149 |
| S2290 | 2GB USB 2.0 | $299 |

## CRUZER MINI

The SanDisk Cruzer Mini line comes in our highest capacities, available up to 4GB. Cruzer Mini is Hi-speed USB 2.0 certified for fast data transfer (also compatible with USB 1.1). Store all your data, pictures, music and more on this pocket-sized device and then easily transfer files between your laptop and desktop.

- Small size and easy to use
- No drivers required *
- Hi-Speed USB 2.0 certified for fast data transfer
- Store all your data, pictures, music and more
- Two extra color caps and a neckstrap included
- Thin design does not obstruct the dual-stacked USB ports found on most computers




**Bundled with:**
**CruzerSync™ * - Free 30-day trial version**
**Cruzer PocketCache * - 7-day trial**
**CruzerLock 2 * - already installed, FREE!**
For Windows only

Rent* $6.71/wk

| | | |
|---|---|---|
| S2287 | 4GB USB 2.0 | $599 |

## SANSA E100 SERIES MP3 PLAYERS




**Features:**
- Headphones included
- Plays MP3, WMA (including secure WMA content), audible audio file formats
- Digital FM tuner with 20 preset stations
- New custom navigation allows sorting songs by artist, album, song title, genre, year, date loaded, and more
- Can be used as an external storage device for data store and transfer
- Enhanced sound fidelity with SRS WOW
- Mass storage compliant, no drivers required
- Up to 17 hours continuous playback using one AAA battery^
- Indigo backlit multi-line LCD display with ID3 tag info

^Based on standard playback, 128kbps MP3 with SRS WOW in off mode.

| | |
|---|---|
| S6834 BLUE 512MB | $149 |
| S6959 SILVER 1GB | $225 |

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# CD/DVD PRODUCTION - BURN & PRINT

## BURN ONLY evocept




**COPYSMART SOLO**
- Speedy 1-1 8x DVD duplicator
- LCD display and 4 button panel
- Dual layer support

S7940 **$499**



**COPYSMART BLAST DVD 3 DRIVE**
- Speedy 3 drive tower duplicator
- 160GB hard drive
- Up to 16x DVD with dual layer support

Rent* $15.68/wk

Q2085 **$1,399**

**COPYSMART BLAST DVD 7 DRIVE**
- Speedy 7 drive tower duplcator
- 160GB hard drive
- Up to 16x DVD with dual layer support



Rent* $24.64/wk

Q2087 **$2,199**

• cd only models also available •

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## BRAVO II DUPLICATE PRINT



PRIMERA TECHNOLOGY, INC

- All in one desktop disc publishing system
- One burning drive & 4800 dpi printer
- 25 disc capacity standard (50 disc capacity using optional kios mode kit )
- Autoprinter only also available
- PC and Mac compatible

Rent* $34.71/wk

N2214 1 CD-R DRIVE **$3,299**

Rent* $40.82/wk

N2215 1 DVD±R DRIVE **$3,999**

## BRAVOPRO DUPLICATE PRINT



PRIMERA TECHNOLOGY, INC.

BravoPro DISC PUBLISHER

- Professional, all-in-one CD/DVD publishing on your desktop
- Totally automated and hands free
- 2 burning drives & 4800dpi printer
- Afterburner print technology for fastest throughput in its class
- 100 disc capacity
- Networking software included
- PC and Mac platform software included

Rent* $48.90/wk

Q9576 2 CD-R **$5,299**

Rent* $55.36/wk

Q9577 2 DVD±R **$5,999**

## RIMAGE DTP360I PUBLISHER



RIMAGE

- Totally automated and easy to install and use
- One DVD/CD burning drive & 4800dpi printer
- 25 disc capacity
- Powerful, intuitive wizard based software
- World class Rimage quality
- Ability to create unique discs using publishing capability

Rent* $40.82/wk

S1146 1 DVD±R DRIVE **$3,999**

## RIMAGE 2000I PUBLISHER

RIMAGE™



- 2 drives CD or DVD
- Totally automated and hands free
- 100 disc capacity
- Incorporates 480i CD/DVD Printer
- Duplication and Publishing capability
- Network software supports PC or Mac clients
- Up to 2 units on one PC
- Plug and play

Rent* $53.51/wk

N2212 2 CD-R **$5,799**

Rent* $59.97/wk

N2213 2 DVD±R **$6,499**

# REMOVABLE DATA STORAGE AND SOLUTIONS




## IMATION SNAP AND WIN COMPETITION

**1st Prizes:**
**3** x NEC LCD Televisions

**2nd Prizes:**
**3** x Canon Digital Cameras and Photo Printers

**3rd Prizes:**
**3** x Imation Disc Stakkas

## HOW TO ENTER:

1 Purchase any Imation product
2 Go to www.imation.com.au
3 Complete the online entry form and attach a photo of your favourite holiday, funniest pet or cutest kid.

**You must retain your receipt to claim prize. Competition closes 5pm AEST on 30/09/05. Terms and conditions apply. See www.imation.com.au**

## IMATION CD-R

52X 700MB/80MIN 25 PACK SPINDLE




S8326 **$15**

## IMATION CD-R

52X 700MB/80MIN 100 PACK SPINDLE




S8327 **$54**

## NEW ForceField™

**Introducing Imation CD and DVD media with ForceField Protective Coating. These new discs feature a unique layer of protection that helps guard your CDs and DVDs from almost everything that everyday life can dish out. Fingerprints, scuffs, static charges that can attract dust, even most scratches are no match for ForceField coating. You can use these discs without worrying about losing your precious memories or valuable data.**

## IMATION CD-R

ForceField 52X 10 SLIM JEWEL CASE




S3986 **$10**

## IMATION CD- R

ForceField 52X 30 PACK SPINDLE




S2663 **$26**

## IMATION DISC STAKKA™




- Perfect for business, studio and home use, with the Disc Stakka you need never waste time searching for a disk again
- Stores, protects and retrieves up to 100 of your favourite CDs or DVDs
- Fully motorised disc insert and eject helps protect your valuable discs
- Simple to set up, linking to your computer via a single USB cable
- Supplied with powerful OpdiTracker Disc Management Software - use to capture disc content, and then search an entire database of stored discs by title, keyword, directory or file name

M4871 **$185**

## Cashback Offer

[1] Purchase the featured product and an Imation USB flash drive (excluding 128MB capacity) between 1 August 2005 and 30 November 2005, to be eligible for $15 cashback via redemption.

[2] Purchase the featured product and an Imation Disc Stakka between 1 August 2005 and 30th November 2005, to be eligible for $30 cashback via redemption.

- For full terms and conditions see **imation.ht.com.au**

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SAMSUNG

# VISUAL DISPLAY OF CHOICE

## SAMSUNG EXTERNAL DOUBLE-LAYER DVD±R/RW DRIVE - USB 2.0



Whether it be a mountain of music, a home movie of epic proportions or a lifetime of digital memories, the sky's the limit with Samsung's 4x speed dual layer DVD burner.

- Interface: USB 2.0
- DVD+R: write 16x, read 12x
- Double Layer: write 5x, read 8x
- Writemaster Technology:
  - O.P.C. Technology
  - Tilt Actuator Compensation Technology
  - SAT (Speed Adjustment Technology)
  - A.B.S. Technology
  - Magic Speed

S2404 **$169**

[1] Bonus game is valid for purchases from 1/09/2005 until 30/09/2005. Full terms, conditions and instructions for redemption can be found at **www.ht.com.au/promotions/samsung_4ms/.** Prince of Persia: Warrior Within™ is a MA15+ title and contains Medium Level Animated Violence, it is recommended for Mature Adults 15 years or older.

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## 17" TFT MONITOR




### 730BF
- **Response Time: 4ms (Grey to Grey)**
- Contrast ratio: 600:1
- Interface: Analogue / Digital
- Maximum resolution: 1280 x 1024
- 3 year on site exchange^

S6830 BLACK / SILVER **$529**

## 19" TFT MONITOR




### 930BF
- **Response Time: 4ms (Grey to Grey)**
- Contrast ratio: 700:1
- Interface: Analogue / Digital
- Maximum resolution: 1280 x 1024
- 3 year on site exchange and zero dead pixel policy^

Rent* $8.17/wk

S6833 BLACK / SILVER **$729**

## 17" TFT MONITOR




### 730B
- Pixel Pitch: 0.264mm
- Contrast Ratio: 600:1
- Viewing Angle(H/V): 160° / 160°
- Response Time: 8ms
- Interface: Analogue / Digital
- Maximum Resolution: 1280 x 1024
- 3 year on site exchange^

S8305 BLACK **$419**

## 19" TFT MONITOR




### 940B
- Pixel pitch: 0.294mm
- Contrast ratio: 700:1
- Viewing angle (H/V): 160° / 160°
- Response time: 8ms
- Interface: Analogue / Digital
- Maximum Resolution: 1280 x 1024
- 3 year on site exchange & zero dead pixel policy^

Rent* $7.61/wk

S8306 SILVER **$679**

Rent* $7.61/wk

S8307 BLACK **$679**

^Please contact Samsung Electronics Australia on **1300 362 603** or email:**monitor.service@samsung.com** for full Terms & Conditions.

ALL PRINTERS SUPPLIED WITH BONUS PRINTER CABLE

SAMSUNG

# QUALITY AND INNOVATION, NO RISK



## MONO LASER PRINTER

**SAMSUNG ML-1740**

- Speed: up to 16ppm/A4, up to 17ppm/letter
- Memory 8MB
- Emulation SPL. Windows, Linux and Mac compatible
- Resolution 600 x 600 dpi
- Maximum paper size: 216mm x 356mm
- Minimum paper size: 76mm x 127mm

P2581 **$179**



## MONO LASER MFP

**SCX-4216F**

- 16ppm mono laser multifunction
- Printer/Copier/Colour Scanner/Fax
- Auto document feeder
- 33.6 kbps fax
- Telstra Duet compatible
- 250 sheet tray
- Windows only
- USB & IEEE1284 connectivity

J2137 **$399**



## COLOUR LASER PRINTER

**SAMSUNG CLP-510**

- 6ppm colour/24ppm mono duplex laser
- Memory 64MB (Max.192MB)
- Resolution up to 1200 x 1200 dpi effective output
- Processor (CPU) Samsung SPGPm
- Emulation SPL-C (Samsung Printer Language Colour)
- 250 sheet tray, 100 sheet MPF, Windows only, USB 2.0
- 3 year onsite warranty

Rent* $7.49/wk

S2190 **$669**



## COLOUR LASER PRINTER

**SAMSUNG CLP-550N**

- 5ppm colour/20ppm mono duplex laser
- Memory 128MB (Max. 384MB)
- Resolution up to 1200 x 1200 dpi effective output
- 10/100BaseTX (ethernet) network card and USB 2.0
- Postscript 3 and PCL 6 emulation. Windows, Linux and Mac Compatible
- 250 sheet tray, plus a 100 sheet MPF
- 3 year manufacturer onsite warranty

Rent* $10.07/wk

P9392 **$899**

## SAMSUNG TONERS

**SAMSUNG TONER FOR ML-1740 3000 PAGE YIELD**
J2380 **$98**

**SAMSUNG TONER FOR SCX-4216F MFC MACHINE**
J9653 **$99**

**SAMSUNG CLP-510 7,000 PAGE BLACK TONER CARTRIDGES**
S2534 **$143**

**SAMSUNG CLP-500 + CLP 550N BLACK TONER 7000 PAGE YIELD**
M9755 **$139**

**SAMSUNG CLP 550 + CLP 550N + CLP 510 CYAN TONER**
M9756 **$155**

**SAMSUNG CLP 550 + CLP 550N + CLP 510 MAGENTA TONER**
M9757 **$155**

**SAMSUNG CLP 550 + CLP 550N + CLP 510 YELLOW TONER**
M9758 **$155**

**SAMSUNG CLP-500 AND CLP-550N ADDITIONAL 500 SHEET PAPER TRAY**
Q1877 **$ 249**

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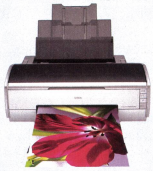
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ALL PRINTERS SUPPLIED WITH BONUS PRINTER CABLE

EPSON®

# EPSON PRINTERS

## EPSON PERFECTION



**STYLUS PHOTO R2400**

New to Epson photographic printing family is the Stylus Photo R2400 – the A3+ inkjet printer designed for fine art reproductions, commercial quality photographs and design proof printing. With an array of Epson-developed technologies including the new UltraChrome K3 Ink set and a 1° wide, multi-layered piezo print head; unrivalled quality is the only result.

- New Epson UltraChrome K3 Ink with Matte Black (or Photo Black), Light Black and now Light, Light Black for outstanding greyscale balance
- 5760 optimised DPI using Epson's Resolution Performance Management (RPM) technology
- 1° wide multi-layered piezo print head for smooth, detailed and fast prints
- Epson's K3 Inks enable quick drying times and greater colour stabilisation

Rent* $19.04/wk

S3206 **$1,699**

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## COLOUR MFP



**EPSON RX700**

- High speed printing - up to 20ppm mono / 19ppm colour
- Scan directly from 35mm film or slides to digital images
- Bluetooth compatible connection for maximum versatility
- Individual Intellidge ink cartridge one for each of 6 colours

Rent* $7.27/wk

S3301 **$649**

## COLOUR LASER AL-CX11N MFP



**EPSON AL-CX11N**

- High speed printing at up to 25ppm mono and 5ppm colour
- Optical scanning resolution up to an enhanced 9600 dpi
- Epson's wrap transfer system for added speed and accuracy of toner placement
- Epson AcuBrite Toner for vibrant and detailed prints

Rent* $16.42/wk

S6829 **$1,465**

## COLOUR LASER



**EPSON AL C3000N**

**High speed printing at 24 pages-per-minute in both colour and monochrome**

- Up to 24ppm in full colour
- Resolution: 600 dpi (2400 dpi with Epson RIT)
- Integrated 10/100 Base TX Network Interface
- Duplexing: Standard
- 600 page input standard

Rent* $21.54/wk

Q7725 **$1,922**

## COLOUR LASER

NEW A3 FORMAT



**EPSON AL C9100**

- Up to 24ppm in colour & monochrome (A4)
- First page out:10.5 seconds in monochrome (A4) 12 seconds in colour (A4)
- Resolution: 2400dpi with resolution improvement technology
- Network interface standard
- Processor: 600MHz

Rent* $46.73/wk

S8053 **$4,939**

## COLOUR LASER



**EPSON AL C4100**

- Up to 24ppm in full colour
- 2400 dpi with Epson RIT
- Integrated 10/100 Base TX Network Interface
- Integrated duplex unit for two-sided printing
- 600 page input standard

Rent* $34.50/wk

L5869 **$3,279**

## PHOTO SCANNER



**EPSON PERFECTION 4990**

- 4800 x 9600 dpi optical resolution
- High optical density
- Windows and Macintosh drivers
- High speed - new moving carriage-type TPU, new lamps, faster film scanning (negative film)
- Productive - simultaneous scan of up to 24 35mm strip frames
- The ideal scanner for professional film scanning with Digital Ice dust and scratch removal for film and prints

Rent* $8.95/wk

R2909 **$799**

# INKJET + MFC

## CANON PRINTERS

### CANON PIXMA IP1600




2 pl ink droplets
4800 x 1200 dpi
6' x 4' : 70 sec
19ppm mono / 16ppm colour
Borderless printing - A4
Compact slant design

S8201 **$99**

### CANON PIXMA IP2200




- 2 pl ink droplets
- 4800 x 1200 dpi
- 6' x 4' : 55 sec
- 22ppm mono / 17ppm colour
- Borderless printing - A4
- Compact slant design
- Optional high yield fine cartridge

S8202 **$129**

### CANON PIXMA IP4200




- 2 pl ink droplets
- 9600 x 2400 dpi
- Contrast plus 5 ink tanks
- 6' x 4' : 51 sec
- 29ppm mono / 19pp colour
- Advanced media handling
- 2 way paper feeding
- Auto duplex printing
- DVD/CD direct printing
- USB 2.0 hi speed

S8203 **$149**

Canon

### CANON PIXMA MP780



The PIXMA MP780 is the ultimate office solution with features including high-quality printing & copying, high resolution scanning and a 33.6Kbps fax modem for super fast faxing.

Q5710 **$549**

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## BROTHER MFC




### MFC-5840CN

- Colour printer, 20ppm (mono), 15ppm (colour), 1200 x 6000 dpi,
- 16MB memory
- Colour flatbed copier, 17cpm (mono) 11cpm (colour), 1200 x 1200 dpi, colour flatbed scanner, 19,200 dpi class (interpolated), scan to key
- Colour fax, 33.6kbps modem
- C-Fax, sends & receives faxes through Windows, sends faxes through Mac

R0308 **$379**



### MFC-8840D

- 5 in 1 laser flatbed MFC with built-in duplex
- Flatbed digital copier up to 20cpm with built-in duplex.
- Plain paper fax 33.6kbps high speed fax modem, up to 5000 page memory
- Laser printer, up to 20ppm, up to 2400 x 600 dpi resolution
- Pcl6 and BRScript 3, built in duplex

Rent* $11.19/wk

N8094 **$999**

Via redemption from Brother. Terms & conditions see **brother.ht.com.au. Postage fee applies.**

brother
At your side.®

**BLACK INK CARTRIDGE**
For MFC - 5840CN (500 page yield)
Q1657 **$29**

**CYAN INK CARTRIDGE**
For MFC - 5840CN (400 page yield)
Q1659 **$15**

**MAGENTA INK CARTRIDGE**
For MFC - 5840CN (400 page yield)
Q1660 **$15**

**YELLOW INK CARTRIDGE**
For MFC - 5840CN (400 page yield)
Q1661 **$15**

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invent

ALL PRINTERS SUPPLIED WITH BONUS PRINTER CABLE

# MONO LASERJET PRINTER SERIES

## HP LASERJET 4345MFP



**IDEAL FOR SMB**
**PRINTER, SCANNER, COPIER**

- Print: up to 43ppm in A4
- First page out: 10 seconds
- Resolution: 1200 dpi
- Easy to use touch screen control panel
- Scan: up to 45cpm (letter) / 43cpm (A4)
- Copy: resolution enhanced 600 x 600 dpi

**HP LJ 4345MPF** Rent* $41.84/wk
R0332 **$4,099**

## HP LASERJET 4250 SERIES



- Up to 43ppm in A4
- Resolution: 1200 dpi
- 500 sheet tray & 100 sheet multi-purpose tray
- Monochrome laser
- Two open industry-standard CompactFlash slots

**HP LJ 4250** Rent* $19.04/wk
Q3919 **$1,699**

**HP LJ 4250N** Rent* $24.45/wk
Q2900 **$2,289**

**HP LJ 4250TN** Rent* $28.83/wk
Q2894 **$2,699**

**HP LJ 4250DTN** Rent* $34.18/wk
Q2890 **$3,249**

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## HP LASERJET 1320 SERIES



**Fast desktop laser printer ideal for small business workgroup or SOHO users**

- Speed: up to 21ppm in A4
- Resolution: 1200 dpi
- First page out: 8.5 seconds
- 16MB RAM

**HP LJ 1320** Rent* $7.83/wk
P9319 **$699**

**HP LJ 1320N** Rent* $9.40/wk
P9320 **$839**

**HP LJ 1320TN** Rent* $11.08/wk
P9321 **$989**

## HP LASERJET 3030 ALL-IN-ONE



$100 CASH BACK[1]

**The space-saving LaserJet all-in-one for business**

- Speed: up to 15ppm (letter) and up to 14ppm (A4)
- Resolution: 1200 dpi
- First page out: 10 seconds
- 32MB RAM
- FastRes 1200
- Copier: 14cpm
- Fax: 33.6kbps fax modem
- Scanner: 600 x 600 dpi optical
- Conectivity: USB & Parallel

Rent* $7.83/wk
M7638 **$699**

## LASERJET 1020



- Speed: 15ppm
- First page out: 10 seconds
- Resolution: 1200 dpi
- Duty cycle: 5000 (pages/month)
- Conectivity: USB 2.0 high speed

R9102 **$229**

## LASERJET 1022 & 1022N



- Speed: 18ppm
- First page out: 8 seconds
- Resolution: 1200 dpi
- Duty cycle: 8000 (pages/month)
- Conectivity: USB 2.0 high speed, 10/100 network solution (for the 1022N only)

**HP LJ 1022**
R9103 **$379**

**HP LJ 1022N**
R9104 **$549**

## LASERJET 2430 SERIES



- Speed: 33ppm
- First page out: 10 seconds

**HP LJ 2430T** Rent* $18.48/wk
Q2891 **$1,649**

**HP LJ 2430TN** Rent* $24.18/wk
Q2892 **$2,158**

**HP LJ 2430DTN** Rent* $24.45/wk
Q2893 **$2,289**

[1]Purchase between 01/08/05 and 31/10/05. Final claims must be received by 5pm EST 10/11/05. See **www.hp.com.au/cashback** for redemption form and terms and conditions. **Standard postage fee applies.** Maximum 4 products claimable per participant.

# HP PRINTERS

## HP COLOR LASERJET MFP 2800 SERIES

BONUS 3 PACKS OF HP SUPERIOR PAPER[1]



Network ready Color LaserJet All-in-One
Print, scan, copy and digital card-slot
Fast laser printing 19ppm mono and 4ppm colour
High quality printing with Image Ret2400
1200 dpi resolution scanner

**HP 2840**
Super G3 Fax V.34 fax modem (up to 33Kbps)
2 Card slots and fax

Rent* $16.24/wk

| | | |
|---|---|---|
| S1223 | HP Color 2820 | **$1,449** |

Rent* $19.60/wk

| | | |
|---|---|---|
| S1217 | HP Color 2840 | **$1,749** |

## HP COLOR LASERJET 2600N PRINTER

BONUS 3 PACKS OF HP SUPERIOR PAPER[1]



Fast 8ppm colour laser printing
High quality, reliable and quiet entry level in line printing
Vibrant quality colour printing with ImageRET2400
Standard 10/100 network printing
Standard 375 page input for versatile printing
Small true personal desktop design

Rent* $8.39/wk

| | | |
|---|---|---|
| S2505 | HP Color LJ 2600N | **$679** |

## HP COLOR LASERJET 4650 SERIES

BONUS HP BUSINESS INKJET 1000[1] WORTH $269



- Up to 21ppm colour and black & white
- 160MB RAM
- 600 x 600 dpi with HP ImageREt 3600
- 100 sheet multipurpose tray and 500 sheet input tray
- 533 MHz RISC processor
- 85,000 pages per month

Rent* $34.78/wk

| | | |
|---|---|---|
| N5949 | HP Color LJ 4650 | **$3,339** |

Rent* $40.71/wk

| | | |
|---|---|---|
| N6043 | HP Color LJ 4650DN | **$3,988** |

Rent* $50.47/wk

| | | |
|---|---|---|
| N6044 | HP Color LJ 4650DTN | **$5,469** |

## HP COLOR LASERJET 3550 SERIES

BONUS HP BUSINESS INKJET 1000[1] WORTH $269



- Up to 16ppm colour and black & white
- 600 x 600 dpi with HP ImageREt 2400
- 64MB RAM
- 533 MHz RISC processor
- 45,000 pages per month

Rent* $19.04/wk

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|---|---|---|
| Q3133 | HP Color LJ 3550 | **$1,699** |

Rent* $23.86/wk

| | | |
|---|---|---|
| Q3134 | HP Color LJ 3550N | **$2,129** |

### HP DESKJET 1280



**HP Deskjet 1280: wider prints, wider value!**
The HP Deskjet 1280 printer is a versatile, wide-format printer designed to meet the needs of business and home office users for fast, high-quality text, graphics and colour images on a wide range of media sizes and types.

- 14ppm mono / 11ppm colour
- Quality printing with up to 4800 optimised dpi
- 5000 pages monthly duty cycle

| | | |
|---|---|---|
| R9756 | | **$418** |

### HP BUSINESS INKJET PRINTER 1000



- Quality business printing at and affordable price
- Fast printing with up to 23ppm mono and 18ppm colour
- Quality printing with up to 4800 optimised dpi
- High capacity (1750 pages 5% coverage) individual cartridges
- High 6250 duty cycle

| | | |
|---|---|---|
| S2344 | | **$269** |

***RENTSMART**
The figures quoted are based on a per week basis over 3 years. Terms and conditions apply.

**PLEASE NOTE:**
All purchases subject to terms & conditions and returns policy.
Delivery charges may apply.
Not all items stocked in store but available for pick-up/delivery.

For Terms and Conditions of bonus offers and downloadable redemption form see **hp.ht.com.au**. **Standard postage fee applies**. Value of bonus items based on Harris Technology sell price as at 01/09/05.

invent

ALL PRINTERS SUPPLIED WITH BONUS PRINTER CABLE

# HP DESKJET & OFFICEJET SERIES

## HP DESKJET 3940




Easy-to-use, compact printer for basic photo and document printing
- Up to 4800 optimised dpi
- Up to 1200 x 1200 dpi black
- Up to 16ppm black
- Up to 12ppm colour
- 80-sheet input tray, 50-sheet output tray
- Intuitive, on-screen menus for easy operation

S7444 **$79**

## HP DESKJET 4255 ALL-IN-ONE



Ultra compact all-in-one: print, fax, scan, copy and phone in one small machine
- Up to 17ppm in black, up to 1200 x 1200 dpi
- Up to 12ppm in colour, up to 4800 x 1200 optimised dpi colour & 1200-input dpi
- Scan quality up to 36-bit colour
- Fax transmission 33.6Kbps

N8513 **$189**

***RENTSMART**
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## HP PSC 1610 ALL-IN-ONE



- Print: up to 23ppm black,18ppm colour, up to 4800 x 1200 optimised dpi
- Scan: up to 1200 x 4800 dpi
- Copy: 600 dpi mono, up to 1200 x 4800 dpi colour
- View, edit and print photos with or without a PC with Pictbridge port
- Digital media card slots

R5058 **$185**

## HP PSC 2610 ALL-IN-ONE



- Print: up to 30ppm black, 20ppm colour, up to 4800 optimised dpi
- Scan: up to 2400 x 4800 optical resolution, 48-bit colour
- Copy: up to 4800 x 1200 dpi colour, up to 600 x 1200 dpi black
- Reduce/enlarge: 25 to 400%

Q2902 **$359**

## HP OFFICEJET 2710 ALL-IN-ONE



- Print: 30ppm black, 20ppm colour, up 4800 optimised dpi
- Fax: 33.6Kbps fax modem
- Scan: up to 2400 x 4800 optical resolution, 48-bit colour
- Copy: up to 30ppm black, 20ppm colour
- Borderless A4 photo printing
- Wired Ethernet and wireless 802.11g networking built-in

Q2903 **$459**

## HP DESKJET 6540



- Up to 4800 optimised dpi
- Up to 30ppm in black
- Up to 20ppm in colour
- Automatic two sided printing
- Front USB port for walk-up laptop printing
- One-touch print quality selector, print cancel button and ink status display
- Borderless A4 photo printing

P9614 **$189**

## HP OFFICEJET 7410 ALL-IN-ONE



- Print: up to 30ppm black, 20ppm colour
- Fax: 33.6Kbps fax modem
- Scan: up to 2400 x 4800 optical resolution, 48-bit colour
- Copy: 30ppm black, 20ppm colour
- Wired Ethernet and wireless 802.11g networking built-in
- Automatic two-sided printing and 50 sheet ADF
- 400 sheet total paper capacity

Rent* $8.28/wk

Q2905 **$739**

ALL PRINTERS SUPPLIED WITH BONUS PRINTER CABLE

KONICA MINOLTA

# HE ESSENTIALS OF IMAGING



## KONICA MINOLTA pagepro® 1300W

- Up to 16ppm A4
- 1200 x 1200 dpi FineART™
- First page less than 13 seconds
- IEEE 1284 parallel, USB interfaces
- Compatibility: Windows 98SE/ME/2000/XP
- 3 year replacement warranty including drum

_6049 **$235**



## KONICA MINOLTA magicolor® 2400W

- 5ppm colour
- 20ppm monochrome
- 2400 x 600 dpi
- Hi-speed USB 2.0 interfaces
- Windows Print System
- 2 year on site warranty

Rent* $7.72/wk

Q8208 **$689**




## KONICA MINOLTA magicolor® 5430DL

- 20ppm colour / 20ppm A4 monochrome
- 64MB RAM (576MB Max)
- 2400 x 600 dpi resolution
- A4, letter, legal page sizes
- Ethernet (10/100BaseTX) & hi-speed USB 2.0 interfaces
- Windows Server 2003/XP/2000/NT4/ME/98, Macintosh OSX v10.2+ compatible & Linux

Rent* $19.71/wk

P8495 **$1,759**




## KONICA MINOLTA magicolor® 5440DL

- 25ppm colour / 25ppm monochrome
- 64MB RAM (576MB Max)
- 2400 x 600 dpi resolution
- Ethernet (10/100BaseTX) & USB 2.0 (hi-speed) interfaces
- Windows®, Macintosh® & Linux compatible
- Optional Direct Photo Print

Rent* $24.64/wk

R4299 **$2,199**




## KONICA MINOLTA magicolor® 5450

- 25ppm colour / 25ppm monochrome
- 256MB RAM (1GB Max)
- 9600 x 600 dpi resolution
- Gigabit Ethernet (10/100/1000BaseTX), Parallel & USB 2.0 (hi-speed) interfaces
- Windows®, Macintosh®, Netware & Linux compatible
- PostScript 3, PCL5, PCL6, JPEG/TIFF direct print
- Direct Photo Print

Rent* $33.34/wk

S3256 **$3,169**

## KONCA MINOLTA MAGICOLOR® 2430DL

**Connect your digital camera directly to this printer**



- Up to 20ppm mono, 5ppm colour
- 10/100BaseTX Ethernet® & USB 2.0 (high Speed) interfaces
- 2400 x 600 dpi resolution
- 200-sheets input standard / 700-sheets input maximum
- Direct Photo Print
- Windows® & Macintosh® compatible
- 2 year on site warranty

Rent* $9.40/wk

R4297 **$839**

## KONICA MINOLTA MAGICOLOR® 2450



- Up to 20ppm mono, 5ppm colour
- 10/100BaseTX Ethernet®, Parallel & USB 2.0 (high Speed) interfaces
- 9600 x 600 dpi resolution
- 200 sheets input standard /700-sheets input maximum
- PostScript 3, PCL5, PCL6
- Direct Photo Print
- Windows®, Macintosh® & Linux compatible

Rent* $12.65/wk

S3254 **$1,129**

***RENTSMART**

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See **konicaminolta.ht.com.au** for redemption form. **Standard postage fee applies**. Purchase must be made by 0/09/2005. Only one redemption available per purchase. Alll claims must be made by 7/10/2005.

# PRINTERS

## FUJI XEROX PRINTERS

FUJI XEROX

**BLACK INK CARTRIDGE**
For C252A
R6900 **$116**

**CYAN INK CARTRIDGE**
For C252A
R6901 **$193**

**MAGENTA INK CARTRIDGE**
For C252A
R6902 **$193**

**YELLOW INK CARTRIDGE**
For C252A
R6903 **$193**

***RENTSMART**
The figures quoted are based on a per week basis over 3 years. Terms and conditions apply.

### DOCUPRINT C525A MONO/ COLOUR

Editor's Choice July 2005 apc



- Speed: 25ppm black; 5ppm colour
- Memory: 64 MB/ 576MB Ram
- Connectivity: Ethernet 10/100Base-T, IEEE1284 parallel and USB 2.0
- Image Processing: 300 MHz processor, CPU and ASIC co-processor
- Print Resolution (dpi): 600 x 600 dpi ; 9600 x 600 Image Enhancement
- Standard Warranty: 1 year on site
- SoHo Colour Laser Printer

Rent* $7.61/wk

R6445 **$679**

### WORKCENTRE 220/222/228




- Print Speed: 20ppm mono
- First page out - less than 13 seconds
- Print resolution - 600 x 600 dpi
- Scan resolution - optical up to 600 x 2400 dpi and enhanced up to 9600 x 9600 dpi

Rent* $6.93/wk

S8096 220 PRINT COPY SCAN **$619**

Rent* $10.14/wk

S8097 222 PRINT COPY SCAN FAX **$905**

Rent* $12.82/wk

S8098 228 PRINT COPY SCAN FAX **$1,144**

## KYOCERA PRINTERS

KYOCERA

### MONO LASER - FS-920



- Up to 18ppm A4
- Power PC 405 266MHz
- 600 x 600 dpi
- 32MB (Maximum: 288MB)
- 11 seconds to print first page
- 250 sheet input cassette
- 15,000 pages per month maximum duty cycle

R3899 **$399**

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### MONO DUPLEX PRINTER - FS-1020D

- Up to 20ppm A4
- Power PC 405 266MHz
- 600 x 600 dpi
- 16MB RAM (Maximum: 272MB)
- 10 seconds to print first page
- A4, B5, letter, legal paper sizes
- 50 + 250 sheet input
- Parallel + full speed USB 2.0
- 15,000 pages per month maximum duty cycle
- Standard automatic duplex unit
- 2 year return to base warranty

N2191 **$545**



### MONO LASER MFP - FS-1118

- Up to 18ppm A4
- 9.5 seconds to print first page
- Standard 250 sheet paper cassette + 50 sheet MPT
- Copying: up to 18ppm digital copier
- Fax system including network fax
- Standard Interfaces: Ethernet 10/100 Base-TX
- 2 year on-site warranty

Rent* $11.19/wk

S5359 **$999**

# Autodesk

## WHAT TODAY'S CAD DESIGNERS WANT

AutoCAD® 2006




AutoCAD LT® 2006

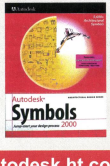



AUTODESK® DWF™ COMPOSER










### AUTOCAD® 2006

AutoCAD® 2006, the 20th release of AutoCAD software, builds upon a tradition of innovation, resulting in true out-of-the-box productivity. Migration is easy, deployment is simple, and intuitive new features make learning a snap. New drafting and annotation tools such as Dynamic Blocks and enhanced hatching eliminate the need for time-consuming workarounds. These new features in conjunction with powerful existing tools like the Sheet Set Manager and tool palettes offer a complete set of tools to manage everything from simple to complex projects. AutoCAD 2006 works the way you've always wanted and brings a new level of efficiency and effectiveness to your everyday tasks.

R7542 **$5,999**

### AUTOCAD LT® 2006

You've spoken and we've listened. The world's number one seller for 2D drafting and detailing, AutoCAD LT® software is better than ever. With AutoCAD LT 2006, hatching is more flexible, dimensioning is improved, and text editing works the way you always wanted it to. Add a more intuitive interface, and the tasks you perform every day are streamlined with just one thing in mind—boosting your productivity. With enhanced editing tools, seamless document sharing, full DWG file format compatibility, and the elimination of tedious workarounds, you've never experienced a more efficient design process. ***UPGRADE FROM LT2002/2004/2005**

R7543 FULL **$1,895** | R7544 UPGRADE* **$690**

### AUTODESK DWF COMPOSER V2

Accelerate design reviews with Autodesk® DWF™ Composer, the all-digital way to review, mark up, and revise 2D and 3D designs. View and print DWG and DWF™ files with accuracy and fidelity, then measure and annotate the DWF file before round-tripping the markups for revisions. Cycle times, errors, and costs will shrink. Efficiency, however, will soar.

S0481 **$349**

### AUTOSKETCH® 9

AutoSketch 9 software provides a comprehensive set of CAD tools for creating precision drawings - from electrical details to floor plans, from conceptual sketches to product specifications, and much more.
**AutoSketch 9 provides**: Comprehensive CAD tools for creating expert-quality drawings • Straightforward drafting in a Windows XP-like environment • Tutorials and wizards for a fast start.

P7266 **$195**

### AUTODESK SYMBOLS 2000

A comprehensive library of Autodesk Symbols covering both Architectural and Engineering services. Simply drag and drop from a toolbar-style graphical interface directly into your AutoCAD drawings.
**Autodesk Symbols 2000 Architectural** - Contains over 5,600 symbols for building design and documentation.
**Autodesk Symbols 2000 Engineering** - Contains over 10,800 symbols covering all aspects of Engineering.

A1319 ARCHITECTURAL **$195** | A1320 ENGINEERING **$195**

## STUDENT EDITION# DESIGNED FOR PROFESSIONALS, PRICED FOR STUDENTS

### MANUFACTURING SERIES




- Autodesk Inventor
- Autodesk Mechanical Desktop
- AutoCAD Mechanical
- AutoCAD (included as part of AutoCAD Mechanical)

R7574 **$265#**

### REVIT SERIES




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- AutoCAD

S5370 **$265#**

### BUILDING SERIES




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- AutoCAD (included as part of Autodesk Architectural Desktop)

R7575 **$265#**

**Autocad, Autodesk Civil 3D and Autodesk VIZ student versions also available separately.**

#Proof of valid student status (of the purchaser) must be provided in order to qualify for this pricing.

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# THE COMPLETE DESIGN ENVIRONMENT FOR PRINT, WEB, AND MOBILE PUBLISHIN

## ADOBE ACROBAT 7.0 PROFESSIONAL



**PRODUCT HIGHLIGHTS**

- Create and reliably exchange content-rich documents
- Assemble multiple files into a single, polished document
- Collect and manage review feedback
- Apply advanced document access controls and security

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|---|---|---|
| Q7822 | WIN | **$639** |
| Q7823 | MAC | **$639** |

## ADOBE ACROBAT 7.0 STANDARD



Adobe Acrobat 7.0 Standard software is the simple way to create and share more secure and reliable Adobe PDF documents. Generate Adobe PDF files that accurately represent the original document, and take advantage of robust tools for sharing information and commenting on electronic files.

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|---|---|---|
| Q7824 | WIN | **$439** |
| Q7825 | MAC | **$439** |

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## ADOBE® CREATIVE SUITE 2



**Adobe Creative Suite 2 Standard** software is a unified design environment that combines full new versions of Adobe Photoshop® CS2, Illustrator® CS2, and InDesign® CS2 software with new Version Cue® CS2, Adobe Bridge, and Adobe Stock Photos.



**Adobe Creative Suite 2 Premium** software combines full new versions of Adobe Photoshop®, Illustrator®, InDesign®, GoLive®, and Acrobat® Professional software with the enhanced Version Cue® file-version manager, the new Adobe Bridge file browser, new Adobe Stock Photos, and support for consistent colour and Adobe PDF file creation, allowing you to realise your ideas mo efficiently than ever.

### ADOBE® CREATIVE SUITE 2 STANDARD

| | | | |
|---|---|---|---|
| R9487 | FULL | WIN | **$1,439** |
| R9486 | FULL | MAC | **$1,415** |
| R9496 | UPGRADE | WIN | **$588** |
| R9497 | UPGRADE | MAC | **$588** |

### ADOBE® CREATIVE SUITE 2 PREMIUM

| | | | |
|---|---|---|---|
| R9485 | FULL | WIN | **$1,835** |
| R9484 | FULL | MAC | **$1,835** |
| R9494 | UPGRADE | WIN | **$875** |
| R9495 | UPGRADE | MAC | **$875** |

## ADOBE PHOTOSHOP CS2

Adobe® Photoshop® CS2 software, the professional image-editing standard and leader of the Photoshop digital imaging line, delivers more of what you crave.



| | | | |
|---|---|---|---|
| R9493 | FULL | WIN | **$989** |
| R9492 | FULL | MAC | **$989** |
| R9499 | UPGRADE | WIN | **$269** |
| R9500 | UPGRADE | MAC | **$269** |

## ADOBE ILLUSTRATOR CS2

Adobe® Illustrator® CS2 software gives you new creative freedom that lets you realise your ideas quickly and powerfully.



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|---|---|---|---|
| R9491 | FULL | WIN | **$876** |
| R9490 | FULL | MAC | **$879** |
| R9503 | UPGRADE | WIN | **$295** |
| R9504 | UPGRADE | MAC | **$295** |

## ADOBE INDESIGN CS2

InDesign CS2 delivers faster production workflows and a more fluid creative environment for designing and outputting professional page layouts.



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| R9666 | FULL | WIN | **$1,199** |
| R9667 | FULL | MAC | **$1,199** |
| R9673 | UPGRADE | WIN | **$295** |
| R9656 | UPGRADE | MAC | **$295** |

# NTRODUCING MACROMEDIA 8 SERIES

## ONE SUITE SOLUTION • INTRODUCING STUDIO 8




### MACROMEDIA® STUDIO 8

Design, develop, and maintain effective online experiences.

- Dreamweaver® 8 - develop websites and applications
- Flash® Professional 8 - author rich interactive content
- Fireworks® 8 - create and optimise web images

Studio 8 now includes:

- Contribute™ 3 - maintain web content
- FlashPaper™ 2 - convert files to PDF and FlashPaper
- A must-have for designing, developing, and maintaining websites and applications
- Integrate video, audio, text, graphics and animation for media-rich experiences
- Ensure consistency and standards support across browsers and platforms
- Great workflow with Adobe®, Microsoft®, and popular nonlinear editing software
- Create, test, and deliver content for millions of mobile phones and devices
- Supports Windows and Mac OS X

S8572 **$1,489**

### MACROMEDIA® FIREWORKS® 8[1]




- Create and optimise web images for maximum quality and minimum size
- Design roll-overs, pop-ups, and animated graphics
- 25 new blend modes for creative effects
- Supports Windows and Mac OS X

S8575 WIN/MAC **$459**

S8576 UPGRADE **$229**

### MACROMEDIA® DREAMWEAVER® 8




he industry's choice for professional eb development.
All-in-one design and code editor to support the way you work
Build standards-based sites using rich visual tools for XHTML and CSS
Integrate XML-based data with a powerful, visual, drag-and-drop workflow
Add Flash Video in less than five mouse clicks
Supports Windows and Mac OS X

S8574 WIN/MAC **$615**

S8580 UPGRADE **$309**

### MACROMEDIA® FLASH® PROFESSIONAL 8




The industry's choice for advanced interactive content creation.

- Experience Macromedia's biggest Flash release ever!
- New filter effects, blend modes, and advanced animation controls
- Easily create and deliver great interactive video
- Deliver consistent, quality end-user experiences
- Create, test, and deliver content for millions of mobile devices
- Supports Windows and Mac OS X

S8579 WIN/MAC **$1,069**

### MACROMEDIA CONTRIBUTE 3




Contribute allows non-technical users to update web content while maintaining site standards for style, layout, and code.

P7376 WIN/MAC **$229**

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# FileMaker

## EFFORTLESSLY MANAGES ALL YOUR INFORMATION




Buy four copies of FileMaker Pro 8 and get a fifth copy free. The ideal solution for small businesses, workgroups or departments.This product is designed to start off your workgroup of 5 or more users (1 manual and 1 CD are included in the 5-pack), and provides a flexible way to grow with your workgroup. Customers will receive a FileMaker Pro 8 five pack which contains one CD and five separate codes. For further information go to: **www.filemaker.com.au/promos/**

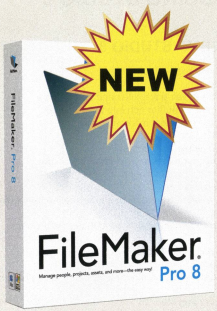
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- 5-pack Retail - S8600
- 5-pack Upgrade - S8601
- 5-pack Edu/Govt - S8602

### BUY MORE, SAVE MORE.

Buy a Volume Licence Agreement (VLA) that includes at least 10 units of FileMaker Pro 7 and you can add a FREE copy of FileMaker Developer 7. PLUS, you have the option to add one copy of FileMaker Server 7 or one copy of FileMaker Server 7 Advanced at a huge 50% off the normal price! This offer is valid between 27th March 2005 and 24th September 2005. Maintenance is also included, so customers will automatically receive FileMaker Pro 8 and FileMaker Pro 8 Advanced plus coverage of future upgrades for 12 months. For further details go to: **www.filemaker.com.au/promos/vla.html**

**PLEASE NOTE:**
All purchases subject to terms & conditions and returns policy. Delivery charges may apply. Not all items stocked in store but available for pick-up/delivery.




### FILEMAKER PRO 8 – IS HERE. WORK FASTER. SHARE MORE.

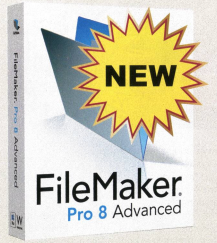
New FileMaker Pro 8 is the best FileMaker ever! Work significant faster and share information with more people and programs than ever before with this exciting new FileMaker upgrade.

It includes breakthroughs in sharing with Adobe Acrobat and Microsoft Office, as well as new features designed to help you wo faster every day.

New features include the ability to:

- Create Adobe PDF files
- Create Microsoft Excel files
- Email the contents of any field instantly
- Search databases easier
- Import tables easily
- Perform email merges
- Create cleaner looking database layouts
- Document databases better
- Build layouts with multiple tabs
- And many more time-saving features, including automatic field completion and integrated spell checker.

S8597 **$450**




### FILEMAKER PRO 8 ADVANCED

New FileMaker Pro 8 Advanced replaces FileMaker Developer and has all the features of FileMaker Pro 8 plus advanced development and customisation tools so you can efficiently build more powerful, more customised databases!

With the ability to customise menus and add Tooltips, as well as robust troubleshooting and database analysis tools, FileMaker Pro 8 Advanced provides powerful tools to:

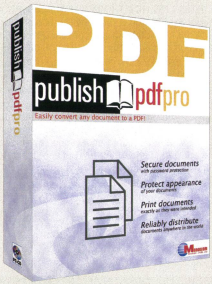
- Add custom menus
- Add custom tooltips
- Import multiple tables at once
- Test scripts without modifying your database
- Create standalone runtime applications
- Create kiosk-based applications
- Build more robust calculations with custom functions
- Generate a report that provides an overview of your database schema

S8604 **$839**

# SOFTWARE

## EASILY CONVERTS ANY DOCUMENT TO A PDF

### PUBLISH PDF PRO




PublishPDF Pro has all the excellent features of the standard PublishPDF, but has extra security features to make it more suitable for sensitive information.

Document security is increasingly important for companies the world over. PDF files, like other file formats, can be edited unless they are protected by encryption. If your documents need to be secure, you need PublishPDF™ Pro which provides password controlled 128bit encryption to protect your documents from unauthorised access or alterations – a must-have for confidential information, legal documents, complex engineering drawings, and more. Also included in PublishPDF™ Pro are other advanced features such as bookmarks and URL links.

Compress files to a fraction of their original size – perfect for emailing and for web downloading.

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| **PublishPDF Pro Academic** | **L8156** | **$89** |
| **PublishPDF Pro (15 - 49 Users)** | **K8291** | **$145*** |
| **PublishPDF Pro (50 - 249 Users)** | **K8294** | **$125*** |

J6099 PUBLISH PDF PRO FULL VERSION **$159**

Price per user.

publish pdf

**PUBLISH PDF**



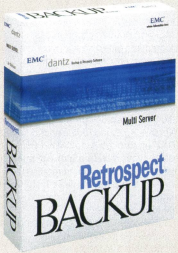

PublishPDF™ software lets you save virtually any document (from Microsoft® Word™documents to complex graphs) in the popular Portable Document Format (PDF).

A PDF file preserves the format of the original document, and contains all the original fonts, images and graphic information, layout and formatting – so what you see is exactly what everyone else sees.

J6097 FULL **$85**

L8155 ACADEMIC **$45**

### DANTZ RETROSPECT BACKUP




Dantz® Retrospect® 7 for Windows provides complete protection for file servers, desktops, notebooks, and business-critical applications.

**RETROSPECT PROFESSIONAL** - Designed for home and small office users who want to protect a single Windows computer and up to two additional networked Windows or Macintosh desktops and notebooks by backing them up to a Windows-based computer.

**RETROSPECT SINGLE SERVER** - Designed for small or midsize businesses with a single server. Runs on Microsoft Windows, Macintosh and backs up and restores a single file server or business-critical application server, as well as desktops and notebooks running Windows, Macintosh and selected Unix-based operating systems.

**RETROSPECT SMALL BUSINESS SERVER*** - Backup and restore a single server running Windows Small Business Server, as well as networked desktops and notebooks running Windows, Macintosh, Linux Red Hat & Suse, and selected Unix based operating systems. Available in two editions - Premium edition and Standard edition. The Standard edition includes an Exchange agent and Disaster Recovery agent for the server while the Premium edition includes all the above plus the SQL Server agent.

R4121 PROFESSIONAL 7.0 **$199**

R4122 SINGLE SERVER 7.0 **$1,059**

EMC² dantz

**ADD-ON PRODUCTS:**

- **EXCHANGE SERVER AGENT**
- **SQL SERVER AGENT**
- **ADVANCED TAPE SUPPORT**
- **OPEN FILE BACKUP**
- **DISASTER RECOVERY**
- **ADD-ON VALUE PACK**

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# SOFTWARE

## SOFTWARE FOR THE BUSINESS

### QUICKBOOKS EASYSTART 2005/06




QuickBooks EasyStart calculates any GST that you collect or pay, as you enter transactions. When it's time to lodge your Business Activity Statement, simply run a Tax Liability Report and you'll have the figures you need for the Tax Office.

R9289 **$99**




Picture for illustration purposes only

### RETAIL STARTER KIT 2005/06.

**RETAIL INTELLIGENCE AT YOUR FINGERTIPS.**
Retail Starter Kit 2005/06 is retail intelligence at your fingertips. Your kit includes a copy of QuickBooks Point of Sale 2005/06 and QuickBooks Plus 2005/06 to track all your sales, inventory, purchase orders, customers and accounting for a complete retail solution.

QuickBooks Point of Sale 2005/06 is designed with all of the tools you need to ensure sales are processed quickly, giving your staff more time to spend with your customers. Train your staff to perform sales, refunds, discounts, customer account transactions, laybys, cash drawer reconciliation and more. All with user friendly options and security features so that you can set up your system to suit the way you run your store.

Also includes 12 months Tech Support & Updates[2]

S8318 **$809**

[1]Terms and conditions apply. Redemption forms and full terms and conditions are available at **www.quicken.com.au/promotions** [2] Normal Advantage terms & conditions apply.

## TURBOCAD SOFTWARE

### TURBOCAD PROFESSIONAL V11

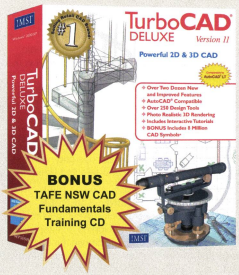



TurboCAD® Professional version 11 is a CAD program where precision 2D drafting is fully integrated with 3D modelling functionality using surfaces and ACIS® solids all in a familiar Windows® environment that delivers unmatched performance with ease of use.

S8293 FULL **$1,125**

S8294 NON COMMERCIAL[3] **$279**

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### TURBOCAD DELUXE V11

TurboCAD® Deluxe version 11 is a powerful 2D/3D full-featured CAD and drafting program. With little or no experience in computer-aided design, you can create accurate 2D sketches, precision drawings, and intricate 3D models with powerful visualisation tools to present your ideas.

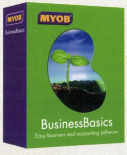
- 250+ 2D & 3D integrated design and drafting tools
- AutoCAD® file sharing. Load, edit, render, save and print DWG/DXF up through AutoCAD 2005
- Access 8 million symbols with a 3 month subscription t CADsymbols.com (Internet access required)
- Surface modelling and photo-realistic LightWorks® rendering engine
- Customisable toolbars & menus
- Interactive tutorials help you design anything fast
- PDF reference manual included on CD
- Industry specific tools & symbols

S8295 **$189**

[3] Full Working version - No student ID required.

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## YOB BUSINESSBASICS

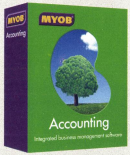



th MYOB BusinessBasics you'll save lots of time d effort as it keeps your banking, sales and contact ormation in one easy to use system.

sue professional-looking tax invoices, track all money ming in and out, and keep a detailed history of your siness transactions. All your information is organised d easy to access so you can spend more time on ur business, not on the books.

G4153 **$89**

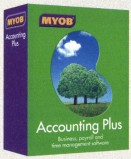
## MYOB ACCOUNTING V15




MYOB Accounting is for businesses that need to streamline accounts procedures and would benefit from improved inventory management, better management of customer and supplier relationships and advanced business reporting.

| | | |
|---|---|---|
| R9042 | FULL | **$249** |
| R9441 | UPGRADE | **$239** |

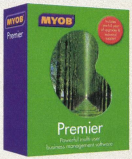
## YOB ACCOUNTING PLUS V15




YOB Accounting Plus comes with an award winning tegrated payroll, is the ideal single-user business nagement tool and is a great accounting solution for naller employers. MYOB Accounting Plus also makes easy to track and charge for your time, and provides ccess to powerful profit-building information about your usiness.

| | | |
|---|---|---|
| R9227 | FULL | **$469** |
| R9442 | UPGRADE | **$259** |

## MYOB PREMIER V9




MYOB Premier is for businesses that need to streamline accounts procedures, whether through simplifying complex inventory issues, running an automated payroll, time billing, accessing advanced reporting or increasing productivity with multi-user access. This product comes with 12 months software support and upgrades.

| | | |
|---|---|---|
| R9228 | FULL | **$1,289** |

## MYOB RETAILMANAGER 8




The complete retail picture. MYOB RetailManager is the perfect fit for businesses who require comprehensive stock management, detailed reporting and more.

With MYOB RetailManager it is easy to keep track of every transaction in your store from sales, stock movements, GST and gross profit, right through to staff performance and even customer details.

S1237 FULL **$1,650**

## MYOB RETAILREADY




**MYOB RetailReady includes:**

- MYOB RetailBasics POS software
- Posiflex Thermal Printer PP7000^
- Posiflex Scanner CD2860^
- Posiflex Cash Drawer CR3100^

**MYOB RetailBasics enables you to:**

- Search for stock and maintain stock items
- Analyse what's selling, what's not and GST collected
- Manage Lay-bys and process refunds

R5316 **$799**

### MYOB RETAILREADY HARDWARE VIA REDEMPTION

^The Posiflex Thermal Printer PP7000, Scanner CD2860 and Cash Drawer CR3100 are available via redemption from MYOB (Colour of Posiflex hardware may vary due to availability). Product must be registered to redeem. Redemption form from inside the box must be completed and accompanied by proof of purchase. **Standard postage of 50c applies to send in your redemption to MYOB.**

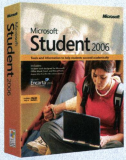
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Microsoft® Office

# MICROSOFT OFFICE

## MICROSOFT® STUDENT 2006




Microsoft® Student 2006 provides the trusted homework tools and resources high school students need for academic success.

**FULL**

S7192 **$129**

## MICROSOFT ENCARTA ENCYCLOPEDIA PREMIUM 2006




- New! Web Companion shows trusted content search results from most any search engine without launching any additional applications
- Encarta content is provided alongside the search results, so users can choose which information better suits their needs
- Find the content & resources quickly & easily

**FULL**

S7705 **$117**

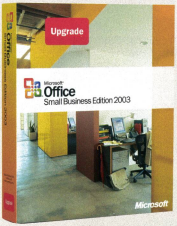
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## MICROSOFT PROFESSIONAL EDITION 2003 ACADEMIC

Microsoft Office Professional Edition 2003 can help you and your organisation communicate information with immediacy and impact. New and familiar programs and improved functionality help you build powerful connections between people, information, and business processes.

| | | |
|---|---|---|
| L0804 | PROFESSIONAL FULL | $749 |
| L0805 | UPGRADE | $499 |
| L0803 | ACADEMIC# | $249 |

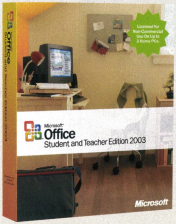



## OFFICE SMALL BUSINESS 2003 UPGRADE

Microsoft Office Small Business Edition 2003 is a personal and business productivity solution that enables small-business employees to:

- More effectively manage customers and sales opportunities
- Create impressive sales and marketing materials
- Manage e-mail and share information efficiently and securely

| | | |
|---|---|---|
| L0826 | FULL | $689 |
| L0827 | UPGRADE | $389 |




## OFFICE STUDENT & TEACHER EDITION 2003

Microsoft Office Student & Teacher Edition 2003 enables you to complete your document-related tasks easily, and allows you and your family to gain the familiarity and skills that will keep each of you ahead of the curve at school and at work.

Offered at the best prices for home users – Office 2003 Student & Teacher Edition includes full versions of Office products (Word, Excel, PowerPoint and Outlook 2003).

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| L0802 | ACADEMIC# | $215 |
| L0800 | OFFICE STANDARD | $615 |
| L0801 | UPGRADE | $369 |

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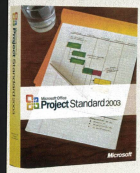
# MICROSOFT OFFICE APPLICATIONS




## VISIO STANDARD 2003

Visio Standard 2003 enables users to visualise, document, communicate, and share ideas with attention-grabbing flowcharts, organisation charts, office layouts, and more.

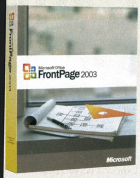
| | | | | | |
|---|---|---|---|---|---|
| L1540 | FULL | **$309** | L1542 | UPGRADE | **$155** |
| L1543 | VISIO PROFESSIONAL FULL | | | | **$749** |
| L1546 | VISIO ACADEMIC | | | | **$99** |




## MICROSOFT PROJECT STANDARD 2003

Project Standard 2003 is designed to improve your ability to organise work and communicate effectively and succinctly through familiar, easy-to-use tools.

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|---|---|---|---|---|---|
| L3553 | FULL | **$939** | L3554 | UPGRADE | **$535** |
| L3231 | ACADEMIC# | | | | **$105** |
| L3556 | PROJECT PRO | | | | **$1,575** |




## MICROSOFT FRONTPAGE 2003

Microsoft® Office FrontPage® 2003 is the Web site creation and management tool that gives you the features, flexibility and functionality to help you build better Web sites. FrontPage delivers the professional design, authoring, data, and publishing tools customers have asked for to create dynamic and sophisticated web sites.

| | | | | | |
|---|---|---|---|---|---|
| L0812 | FULL | **$325** | L0813 | UPGRADE | **$170** |
| L0814 | ACADEMIC# | | | | **$150** |




## MICROSOFT PUBLISHER 2003

Comprehensive solution for creating and publishing a wide variety of publications for desktop printing, commercial printing, e-mail distribution, or viewing on the Web. Start from professionally designed templates that you can customise with colour schemes, font schemes, various layout options, and your own design sense.

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| L0822 | ACADEMIC# | | | | **$145** |

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## MICROSOFT® ONENOTE™ 2003




Microsoft Office OneNote 2003, is the Microsoft Office System note-taking and management program that enables you to capture, organise, and reuse your notes on laptop computers, desktop computers, or Tablet PCs.

**FULL**

L0906 **$149**

**ACADEMIC#**

L0907 **$79**

## MICROSOFT® DIGITAL IMAGE SUITE 2006




Microsoft Digital Image Suite 2006 brings together all the sophisticated tools you need to organise, enhance, create and share your digital photos. It offers powerful tools that are intuitive and easy to use, no matter what your skill level. It's the complete photo solution that grows with you.

**FULL**

S7299 **$139**

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## HP COMPAQ nx6120

**PACKED TO PERFORM, PRICED TO PLEASE**

The HP Compaq nx6120 Business Notebook is packed with advanced technology features offering solid performance at a surprisingly affordable price. What's more, most models come with wireless connectivity so that you can get the job done effortlessly, wherever your work takes you.

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**$139[1]**

R4055
(Normally $279)

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The HP Compaq nx8200 series Notebook PCs combines the processing and graphics power of a desktop with the mobility and convenience of a notebook. It offers users high performance processing and graphics capabilities in a travel friendly, thin and wide form factor. The sleek design and the advantages of a 15.4" widescreen display, is perfect for the mobile professionals.

From **$2,495**

† See Page 10 for full details and all the models available in the HP nx series.

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